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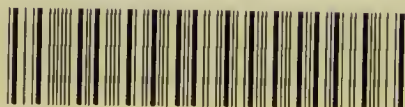
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A
TREATISE
ON
MORTAL DISEASES;

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CONTAINING
A PARTICULAR VIEW OF THE DIFFERENT WAYS,
IN WHICH THEY LEAD TO DEATH,
AND
THE BEST MEANS OF PREVENTING THEM, BY MEDICAL
TREATMENT, FROM PROVING FATAL:

38

TRANSLATED FROM THE LATIN,
CORRECTED, IMPROVED, AND CONSIDERABLY ENLARGED,

BY THE

AUTHOR,

CONRAD GEORGE ONTYD, M.D.



“Odi profanum vulgus et arceo, quod omnem veteribus in re salutari
perspicaciam vel abnegat, suamque huic substituit; vel omnem his solis
attribuens, quæ nova sunt prorsus abhorret.”

J. P. FRANK, in *Præf. ad Rat. Inst. clin.*
Ticinenfis J. FRANK.

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TO THE
PRESIDENT, COUNCIL, AND FELLOWS
OF THE
ROYAL SOCIETY OF LONDON,
FOR IMPROVING NATURAL KNOWLEDGE.

MY LORDS AND GENTLEMEN,

AS phyfic ranks among the first of the arts and sciences, both with respect to the importance of it's object, which is to preserve the health and lives of mankind, and because it explains many phenomena of nature; a work intended to clear up many intricacies both in pathology and the practice of phyfic, and which besides serves to elucidate several points in natural history, cannot be more properly dedicated than to the learned members of the Royal Society; who have as constantly patronised science in others, as they are universally renowned for the cultivation of it in themselves.

With the hope, my LORDS and GENTLEMEN, that this work may not be found unworthy of your attention, - I take the liberty of presenting it to you, and am, with the utmost respect and veneration,

MY LORDS AND GENTLEMEN,

Your most devoted,

Most obedient, and

Most humble Servant,

London,
Aug. 24, 1798.

C. G. ONTYD.

PREFACE.

SOME diseases, though rendering the life of those who labour under them very uncomfortable, have not a fatal termination, unless indirectly; of course do not admit of consideration here. These disorders are, however, very few in comparison of the many diseases, which may end in death. The object of this work is to consider the nature of the latter; to explain the different ways, in which they may destroy life, and to inquire into the most powerful means of preventing them from proving fatal.

To deliver a system of the doctrines and rules proper for directing the Practice of Physic, is justly called by the illustrious Dr. Cullen an undertaking of great difficulty; and it is with the utmost diffidence, that I undertake such an arduous task, as to explain the different ways, in which mortal diseases lead to death, and the means best calculated to counteract their noxious operation. The extreme difficulty, that necessarily attends a research of this kind, will appear striking to any one, who considers even for a single moment the

great obscurity, in which the nature of many diseases is involved, and how little acquainted we hitherto are with their proximate causes, and their manner of acting on the human body.—Indeed nothing but the great utility, that must result from a work of this kind, though it should be a very imperfect one in itself, both with respect to Pathology and the Practice of Physic, would have induced me to make the attempt.

As a particular inquiry into the causes, symptoms, diagnosis, and prognosis of every disease was requisite, in order to show, why death is always ushered in, whatever may be the malady, in a determinate form; why it may be accompanied with nearly the same symptoms in different diseases; and, *vice versa*, why the manner of dying may vary in the same disorder: it appeared to me, that, to prove the consistency of the manner of dying with the nature of every disease, and to point out the most powerful means of preventing their fatal termination, the following plan was best calculated.

After collecting a stock of facts relative either to the diseases of the human body, or to the morbid appearances after death in different diseases, as fully as the compass of this work would admit; and being careful not to give any, but what are
either

either taken from authors, the abilities and veracity of whom are beyond question, or have fallen under my own observation; I have attempted to apply those facts, compared with an attentive observation of the symptoms attending the different diseases, to the investigation of their proximate causes, and their different ways of destroying life; and have endeavoured to establish upon these a more decided and successful method of cure. In short, this treatise is to be looked upon as an attempt to apply the discoveries contained in the valuable works of Bonnet, Morgagni, Soemmering, Baillie, and many other celebrated physicians and anatomists, with respect to the morbid changes the human body undergoes in different diseases, together with an accurate observation of the symptoms, which take place during life, to the general science of medicine, and especially to its practice. How far I have been successful in this attempt, I shall leave my readers to judge.

In aiming at this, I flatter myself, that I have avoided all hypotheses, or what have been improperly called theories. I have indeed attempted to establish many general doctrines, as well pathological and therapeutical as physiological; chiefly, however, in as far as they ultimately lead to a successful practice: but, I trust, that these are only inferences drawn from a cautious generalization of

facts. Lastly, as this system of the theory and practice of mortal diseases is built upon practical observations, an accurate attention to the symptoms the different diseases exhibit during their whole course, and the morbid appearances to be observed after death; any one, who shall oppose it, must do it either by showing, that I have been deficient in collecting a sufficient number of facts, too incautious in adopting, or mistaken in applying them.

Upon an accurate inquiry into the grounds, on which every chapter of the Practice of Physic was founded, I have very often been obliged to differ from the hitherto prevailing doctrines; but, as all the theories, which I have attempted to offer on the nature of the different mortal diseases, originate from practical observations; though they may be opposed and criticised by those, who, having been educated in one system or other, are of opinion, that the present state of medicine does not require any change, or admit of any amendment; the impartial Public will in general, I trust, think me justified in receding from the established theories; at least I no where advance a peculiar and new doctrine, without assigning the reasons, which would not allow me to embrace the common opinion, the sufficiency of which I leave to the consideration of my readers.

On many occasions I have, indeed, recommended a method of cure partially or wholly different from the common practice. As this recommendation, however, has not been the result of theoretical speculations made in the closet, but of experience at the side of the sick bed, and an accurate attention to the success of the different remedies employed, in patients, who either have fallen under my own observation, or under that of other practical physicians, the veracity and abilities of whom are beyond dispute, I willingly submit to the judgment of the impartial practitioner, on giving both methods a fair trial, which of them answers best the purpose, and deserves to be generally adopted.

In the course of this work I have frequently been under the necessity of taking a critical notice of doctrines advanced by different medical gentlemen, of whom there are several still alive. This has been done, I trust, with all the candour and modesty the circumstances of the question could possibly admit: but I thought it incumbent on me to point out particularly the imperfections and deficiencies of prevailing doctrines, in order to show the propriety and necessity of suggesting new ones; and it seemed to me to be the duty of every professional man, to improve the general science of medicine, and especially its practice, by endeavouring to correct those doctrines, which he deems erroneous.

If,

If, however, any one should be disposed to interpret my conduct otherwise, I answer with Sydenham :
 “ Non mihi, sed rationi, aut quæ ratio esse videtur,
 “ milito, securus quid mordicus tenet hic aut hic.”

I have been careful to avoid all unnecessary technical terms, and all denominations and distinctions of diseases, which communicate either no clear idea of their nature, or an erroneous one: for though in the foundation of every system of Physic a certain methodical arrangement, if not necessary, is at least useful, and a division of diseases into classes, orders, genera, and species, may greatly contribute to give both a general notion of the diseases contained in each class, and a distinct idea of the nature of each disease; yet, if these nosologic distinctions be carried beyond a certain point, instead of throwing light upon the subject, they are apt to cause confusion, they obscure the science with technical terms, at best useless, and a young man just coming from the university, with his head full of theoretical notions and fine nosologic distinctions, will, I believe, frequently be embarrassed at the side of the sick bed, on finding, that these theoretical notions do not exactly correspond with the symptoms observed in his patients. Indeed I cannot help thinking, that nosologists have gone much beyond the point of illustration; and that many systematical distinctions originate rather from

theoretical speculation, than from practical observation : of course, being either superfluous, or not applicable to practice, they may, with great propriety, be expunged from the medical page.

The famous Dr. John Brown saw very clearly, that the system of physic was overloaded with a great number of useless technical terms, and nosologic distinctions ; and in founding his system took great care to exclude them. But as men are very apt to run from one extreme into another, he fell into the mistake of simplifying too much ; his doctrine, well adapted to captivate the imagination of a speculative mind, appears simple, complete, and dazzling to the student, but is by no means so well suited to inform the judgement, or to clear the doubts of the practitioner ; and the impossibility in many cases of applying it's precepts to practice will doubtless prevent the cautious observer of nature's operations from adopting it.

Many parts of the Brunonian doctrine, however, are secure from criticism ; and whatever changes and revolutions the art of physic may undergo in progress of time from the introduction of fresh facts and experiments, it's ingenious author will always have the credit of having shown the impropriety of the antiphlogistic treatment in many cases, where it has been very warmly recommended even by
Dr.

Dr. Cullen; of having introduced into the practice of physic a more liberal use of stimulants, and a more general exhibition of active remedies, than any one of his predecessors; and of having reduced the healing art to general principles, which, though open to many exceptions and modifications, yet upon the whole have been productive of many good effects.

This work was first published in latin, at Leyden, in the year 1797. In the present edition I have revised the whole, and from more mature reflection, from a great number of practical cases that have fallen under my observation since that time, from conversing with different practitioners, and from the observations of other physicians communicated to me since, I have been enabled to correct some of my former observations, and to make many improvements, and considerable additions. In fine, in this edition I express with more confidence some of my former remarks, and have omitted others, which I had advanced without sufficient foundation.

Although I have ventured to offer this work to the public, yet I am very sensible of it's imperfections, for notwithstanding the greatest care and attention have been employed in collecting a sufficient stock of facts from the best sources, in
 comparing

comparing them together, and in drawing conclusions from a cautious and full induction, yet several inaccuracies and mistakes will no doubt have escaped me, which, on considering the extent and abundance of the matters to be noticed, they, I hope, will readily excuse, who, having themselves made researches of this kind, are not unacquainted with the difficulties attending them.

Though I have occasionally mentioned the names of those medical gentlemen, who have favoured me with the communication of practical facts, yet I feel a particular pleasure on this occasion in giving a public testimony, how much I am obliged to my worthy preceptors, the professors in the different branches of medicine at the university of Leyden, for the many marks of kindness and friendship they have bestowed upon me, during my attending lectures at that university, and for the kind assistance they have afforded me in collecting materials for this work; which offices the author will always remember with gratitude, and with high esteem for their characters.

I have also much satisfaction in acknowledging here the obligations I am under to Dr. J. G. Schæffer, physician-general to the Hanoverian troops, the military hospital of which was at Leyden in the year 1794, who, agreeably to the urbanity of his manners, and the philanthropy of
his

his heart, readily permitted me to visit the patients, and thus furnished me with an opportunity of making many practical observations, exclusive of the important advantages I derived from assisting in the numerous dissections of patients, who died of different complaints, and thus observing the morbid appearances after death.

For the sake of order I have adopted the following methodical arrangement.

I divide the whole work into three parts.

In the first I treat of death, it's relation to health and sickness, and it's proximate and remote causes in general.

In the second I consider those diseases, which bring on death by destroying the vital principle.

In the third I take notice of the disorders, which occasion death, either by suppressing some function requisite to life, or by destroying some vital organ.

The following table of contents will indicate the different chapters of every part.

TABLE

OF

CONTENTS.

	Page
PART I. <i>Of Death, and it's Causes in general</i> - - -	I
PART II. <i>Of the Diseases which bring on Death by the</i> <i>Destruction of the vital Principle</i> - - - - -	27
CLASS I. <i>Death from the Mechanism of the Body itself</i>	29
GENUS I. <i>Death from old Age</i> - - - - -	ib.
CLASS II. <i>Death from the Passions of the Mind</i> - -	38
ORDER I. <i>The exciting Passions</i> - - - - -	39
GENUS I. <i>Joy</i> - - - - -	ib.
II. <i>Anger</i> - - - - -	42
ORDER II. <i>The depressing Passions</i> - - - - -	45
GENUS I. <i>Terrour</i> - - - - -	ib.
CLASS III. <i>Death from Abundance or Want of Caloric</i>	49
ORDER I. <i>Death from the Abundance of Caloric</i> - -	ib.
GENUS I. <i>Too great Heat</i> - - - - -	ib.
II. <i>Burning</i> - - - - -	51
ORDER II. <i>Death from the Want of Caloric</i> - - -	53
GENUS I. <i>Too intense Cold</i> - - - - -	ib.
CLASS IV. <i>Death from the electric Shock</i> - - -	56
GENUS I. <i>Too great Electricity</i> - - - - -	ib.
CLASS V. <i>Death from Gas noxious to the animal Economy</i>	59
ORDER I. <i>Death from Gas mortal from too much Oxygen</i>	ib.
GENUS I. <i>Pure Oxygen Gas</i> - - - - -	ib.
ORDER II. <i>Death from Gas mortal for Want of Oxygen</i>	61
GENUS I. <i>Azotic Gas</i> - - - - -	ib.
II. <i>Hydrogen Gas</i> - - - - -	62
	SPECIES

	Page
SPECIES I. Sulphurised hydrogen Gas - - - -	63
----- II. Carbonated hydrogen Gas - - - -	65
----- III. Phosphorated hydrogen Gas - - - -	66
----- IV. Hydrogen Gas combined with azote and carbonic Acid - - - - -	67
ORDER III. Death from Gas mortal from a peculiar Stimulus - - - - -	71
GENUS I. Carbonic Acid Gas - - - - -	73
CLASS VI. Death from Poisons - - - - -	79
ORDER I. The Poisons of the animal Kingdom - - -	81
GENUS I. Poisons bringing on Death principally by Means of a Wound - - - - -	ib.
SPECIES I. The Viper - - - - -	ib.
----- II. The Insect called Furia Infernalis -	88
----- III. The Bite of mad Animals - - -	ib.
GENUS II. Poisons bringing on Death principally when swallowed - - - - -	94
SPECIES I. Cantharides - - - - -	ib.
ORDER II. Vegetable Poisons - - - - -	96
GENUS I. Narcotic Poisons - - - - -	97
SPECIES I. Opium - - - - -	ib.
----- II. Leaves of the Lauro-Cerasus - - -	102
GENUS II. Narcotic acrid Poisons - - - - -	105
SPECIES I. Deadly Nightshade - - - - -	ib.
----- II. Water Hemlock - - - - -	107
GENUS III. Acrid Poisons - - - - -	108
SPECIES I. Wolf's Bane - - - - -	ib.
----- II. Hemlock-Dropwort - - - - -	111
ORDER III. Mineral Poisons - - - - -	113
GENUS I. Oxyds - - - - -	114
SPECIES I. Oxyd of Arsenic - - - - -	ib.
GENUS II. Neutral Salts - - - - -	121
SPECIES I. Hydrargyrus muriatus - - - - -	ib.
APPENDIX. The Poison called Tucumas - - - -	126
CLASS VII. Death from universal Diseases - - -	130
ORDER I. Fevers - - - - -	ib.
GENUS I. Intermitting Fever - - - - -	132
----- II. Bilious or Gastric Fever - - - -	138

	Page
GENUS III. <i>Nervous Fever</i> - - - - -	142
——— IV. <i>Putrid Fever</i> - - - - -	148
——— V. <i>Inflammatory Fever</i> - - - - -	158
——— VI. <i>Catarrhal Fever</i> - - - - -	162
ORDER II. <i>Febrile Diseases</i> - - - - -	164
GENUS I. <i>The Plague</i>	
——— II. <i>The Small Pox</i>	
——— III. <i>The Measles</i>	
——— IV. <i>Scarlet Fever</i>	
——— V. <i>Erysipelas</i>	
——— VI. <i>Miliary Fever</i>	
——— VII. <i>Petechial Fever</i>	
——— VIII. <i>Nettle Rash</i> *	
APPENDIX. <i>Death from the Rheumatism, and the Gout,</i>	
<i>when repelled</i> - - - - -	188
<i>Rheumatism</i> - - - - -	189
<i>Gout</i> - - - - -	195
PART III. <i>Of Death ensuing when the Action of any</i>	
<i>vital Organ is suppressed; or of the Death which follows</i>	
<i>the disordering of the Chain of the vital Powers from the</i>	
<i>Action of one or two Links in the Middle being destroyed</i>	216
CLASS VIII. <i>Death from Inflammations</i> - - - -	218
ORDER I. <i>Inflammations of the Head</i>	
GENUS I. <i>Inflammation of the Brain</i>	
——— II. ————— <i>Ear</i>	
——— III. ————— <i>Tongue</i>	
——— IV. <i>Sore Throat</i>	
ORDER II. <i>Inflammations of the Breast</i>	
GENUS I. <i>Pleurisy</i>	
——— II. <i>Peripneumony</i>	
——— III. <i>Inflammation of the Heart</i>	
ORDER III. <i>Inflammations of the Abdomen</i>	

* As the exanthematous diseases, in my humble opinion, are only mortal by accident; and as all the danger that accompanies them is to be derived either from the epidemic constitution, or from the morbid diathesis of the body, combined with the exanthematous disorders, I have not treated of each of them in particular, but of them all in general.

GENUS I. <i>Inflammation of the Diaphragm</i>		
———— II.	————	<i>Peritoneum</i>
———— III.	————	<i>Omentum</i>
———— IV.	————	<i>Stomach</i>
———— V.	————	<i>Intestines</i>
———— VI.	————	<i>Pancreas</i>
———— VII.	————	<i>Mesentery</i>
———— VIII.	————	<i>Liver</i>
———— IX.	————	<i>Spleen</i>
———— X.	————	<i>Kidnies</i>
———— XI.	————	<i>Urinary Bladder</i>
———— XII.	————	<i>Prostate Gland</i>
———— XIII.	————	<i>Womb</i>
———— XIV.	————	<i>Ovary*</i>
CLASS IX. <i>Death from Fluxes</i>		242
ORDER I. <i>Fluxes of the Belly</i>		<i>ib.</i>
GENUS I. <i>Diarrhœa</i>		<i>ib.</i>
———— II.	<i>Dysentery</i>	244
———— III.	<i>Cholera</i>	272
———— IV.	<i>Vomitus Cruentus, Morbus Niger, Hepa-</i>	
	<i>tirrhœa, and Hemorrhoids</i>	275
ORDER II. <i>Hemorrhages</i>		289
GENUS I. <i>Hemorrhages in general</i>		<i>ib.</i>
————	<i>Hemoptoe</i>	293
CLASS X. <i>Death from Cachexies</i>		303
	<i>Hectic Fever</i>	<i>ib.</i>
ORDER I. <i>Ulcers</i>		309
GENUS I. <i>Phthisis</i>		<i>ib.</i>
———— II.	<i>Caries of the Bones</i>	337
———— III.	<i>Lues Venerea</i>	345
———— IV.	<i>Leprosy</i>	364
ORDER II. <i>Atrophies</i>		371
GENUS I. <i>Tabes</i>		<i>ib.</i>
———— II.	<i>Jaundice</i>	375

* These are the inflammations, by which mankind may die, and which, for the sake of order, I have judged proper to enumerate here, though I have treated of them all together, on account of the great analogy which exists among them all.

	Page
GENUS III. <i>Dropsy</i> - - - - -	404
ORDER III. <i>Debilities and Privations</i> - - - - -	425
GENUS I. <i>Scrofula</i> - - - - -	<i>ib.</i>
—— II. <i>The Rickets</i> - - - - -	446
—— III. <i>Scurvy</i> - - - - -	460
—— IV. <i>Aneurism</i> - - - - -	490
—— V. <i>Mortification</i> - - - - -	495
CLASS XI. <i>Diseases of the nervous System</i> - - -	504
ORDER I. <i>Atony of the nervous System</i> - - - - -	509
GENUS I. <i>Apoplexy</i> - - - - -	<i>ib.</i>
—— II. <i>Palsy</i> - - - - -	528
ORDER II. <i>Spasm</i> - - - - -	531
GENUS I. <i>Tonic nervous Diseases</i> - - - - -	532
SPECIES I. <i>Tetanus</i> - - - - -	<i>ib.</i>
GENUS II. <i>Clonic nervous Diseases</i> - - - - -	542
SPECIES I. <i>Epilepsy</i> - - - - -	<i>ib.</i>
CLASS XII. <i>Diseases of the secretory Organs</i> - -	554
ORDER I. <i>Alteration of the Action of the Secerning Vessels</i> <i>ib.</i>	
GENUS I. <i>Polysarcia</i> - - - - -	<i>ib.</i>
ORDER II. <i>Alteration of the Structure of the Secerning</i> <i>Vessels.</i> - - - - -	569
GENUS I. <i>Diabetes</i> - - - - -	<i>ib.</i>
—— II. <i>Cancerous Ulcer</i> - - - - -	630
CONCLUSION - - - - -	635



A

TREATISE

ON

MORTAL DISEASES.

Containing a general View of the different Ways, in which they bring on Death, and the best Means of preventing this Termination of them by medical Treatment.



PART I.

Of Death, and it's Causes in general.

DEATH may be justly defined to be the extinction of the vital principle, or of the life of the whole body. The character of life consists in this, that the primary constitutive parts of the animal body are prevented by it from entering into those combinations, to which they are incited by the universal law of attraction, as well as by the special law of chemical affinity.—That this depends only on the energy of the vital principle, is wholly proved by the phenomena observed a short time after death; for as soon as life is destroyed, and there remain in the animal body only the powers of those elements of which it is composed, these, being no more checked in their action by the vital principle, are disengaged, and cause the phenomena, that follow

the laws of chemical affinities, and effect the spontaneous destruction of the compages formerly organic or vital.

Thus the character of death is opposed to that of life, and must be derived from it, because it is a negative quality.

Death, therefore, must be said to have taken place, not when the actions of the human body have apparently ceased; as life may be hidden for some time in such a degree, that not only the actions, which are called vital by pre-eminence, such as the pulse and respiration, are stopped; but even the least motion cannot be felt; for there are many instances of men, who, with every appearance of death, deemed dead by every beholder, nay even buried, have been recalled to life by powerful stimuli*.---But the body is to be called dead when the vital principle is totally abolished; or when at the same time it has lost the faculty, which renders it susceptible of being roused by a powerful *stimulus*. Thus the true notion of death consists not in the stoppage of the circulation of the blood, or the ceasing of respiration, but in this, that the body will no more act in obedience to *stimuli*; or, to speak more clearly, death is the extinction of this peculiar quality, that belongs to living bodies alone, and which gives to the constitutive parts of the animal body, when well stimulated, the faculty of exciting certain and determinate motions, and of per-

* See J. J. Bruhier *sur l'Incertitude des Signes de la Mort*, vol. II. Paris, 1749.

forming the functions, to which they are subservient*.

Death consequently is nothing, but the extinction of the faculty of answering a *stimulus*, so that an action may follow, which does not depend on the universal principles of bodies. Whatever occasions bodies to lose this faculty should be looked upon as the proximate cause of Death†.—But as death is always found to be like itself, it is necessary, that it's proximate cause also should be ever the same, as it contains in itself the complete reason of dying: however, to determine in what this proxi-

* Thus the illustrious Gaubius, in *Instit. pathol.* § 170, improperly calls the vital power of the solids that faculty, by which the part contracts itself on being stimulated. For the vital power, and the contraction of the solids, should be well distinguished:—the first is the faculty of feeling *stimuli*, according to certain laws, and of re-acting in consequence of them: on the contrary, the vital motion itself is the effect of that faculty on being stimulated: for it is a general law, that the vital power should be incited to act by *stimuli*.

† Take notice, that I speak here of universal life, or of the life of the whole body; for, when this is nearly extinguished, the particular life of some organs, and also the faculty of answering duly to *stimuli*, may for some time still remain. If, for instance, a man should not die by the abolition of the vital principle, but by the destruction of the vital functions, especially if external violence should be the cause; in this case, where the particular life of some organ may still remain, absolute death will not yet be present; but the consent of the particular life of that organ with the vital principle will be entirely taken away: as I have proved in my Dissertation on the Cause of Absorption, chapter 1, page 30, by many experiments, that the particular life, especially of the absorbent vessels, will sometimes remain, though the vital principle should be already extinguished.

mate cause of death properly consists, would be difficult.—Van Geuns is the first physician whom I know to have mentioned the proximate cause of death; yet even Van Geuns, though he asserts, that it does not differ from death itself, and is a privative quality, which consists in the cessation of life, does not define what the proximate cause of death is, or by what means life ceases, and that privative quality is produced.—In my humble opinion, the proximate cause of death should be looked for in the destruction of the vital powers; but that the means, by which this destruction is operated, may clearly appear, we must consider life, health, and sickness. The following paragraphs serve to this purpose.

A living body is one, that has powers and motions not to be explained from universal principles.—But what life is, physiologists do not agree. In general life is considered as a principle superadded to organic bodies. Some of the physiologists place it in the nervous fluid, the existence of which has never been demonstrated. Others talk of the matter of life distributed throughout the whole body. According to the Brunonian system, every person brings with him into the world his determinate portion of life; which being worn out in consequence of the waste of his excitability, he is carried off. Supposing this to be the case, nature must have allowed but a small portion of life to the half of mankind, so many dying in infancy. Few physiologists suspect, that life is to be looked for in the organization itself, and is to be considered as an effect of it. The very ingenious Dr. Aitkin, however,

ever, is well aware of the fact; for, speaking of life, he expresses himself in the following manner. "As the functions in every instance depend on the mechanism or structure of the organs, (for they are invariably affected by every cause that affects this); it is a necessary consequence, that life is not a principle superadded to organization, but the effect of it; therefore we may safely regard the terms life, vitality, vital principle, living principle, excitability, as synonymous, and expressing a condition of the organs only *." Thus, in the same manner, as a determinate union of nervous fibres forms a nerve, and in it a power named sensibility, which is nothing but an effect of it's peculiar organism, so likewise all deviations from the healthy state are to be looked upon as so many derangements of the organization of the body. The objection, that life cannot be the effect of the organism, because, in many disorders, the structure is not sensibly altered, is of no weight; as the eye, even when aided by glasses, is not always competent to detect slight changes of the structure; it would, therefore, be contrary to sound reasoning, and against the general rule, "as the effects, such are the causes," to maintain, that diseases are not alterations and derangements of the organism of the body, because we are often incapable of detecting changes of the structure in the affected parts.—But if life be the effect of organism, and if almost every part of the body be differently organized, the natural inference must be, that there are so many modifications of life, as there are dif-

* John Aitkin's *Principles of Anatomy and Physiology*, Vol. ii, Page 119.

ferent organisms of the various parts of the human body. Hence the different species of the vital powers recorded by physiologists, as irritability, sensibility, contractibility, &c. Each of these powers contributes it's part to the support of the animal economy, and from the combination of all these results the vital principle, or the life of the whole body.—The universal life ought, therefore, to be considered as a chain of many powers, which, co-operating together, constitute a certain harmony, called *health*. For what is health, but a perfect and harmonious concord and equilibrium of the organs of the human body and it's powers? Thus, if this harmony of powers suffer only a slight disturbance, in reality a disease already exists; but it is customary not to call it a disease, before the harmony of powers is disturbed so much, that the actions proper to the human body can no longer be well and easily performed.

To disturb the equilibrium of the vital powers, or to cause illness, there is always required,

1. That a morbid stimulus should affect the body. —For it is obvious, that nothing can afflict us, unless the body be some way affected.

2. The re-action of the vital powers. As it is also evident, that the vital powers could not be affected without re-acting; since it is proved above, that life consists in the faculty the solids have of re-acting when operated upon by stimuli. —Thus two requisites always concur to produce sickness; namely, the action of the morbid *stimulus*,
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and the re-action of the vital powers; from the concurrence of which sickness itself is produced, that is, an effect occasioned by the action of the noxious power, and the re-action of the organs of the animal body*.

Hence may be explained, why some men, though often connected with diseased women, are not punished with the foul disease; and also the reason of the phenomena observed during the reign of every contagion; as, for instance, why from one and the same morbid *stimulus* arise various diseases in different subjects: for if the re-action be wanting, the noxious power cannot produce any effect, consequently no distemper will ensue; and by the different re-action of the vital principle the disorder is differently modified, and assumes various forms.

If thus various diseases arise from the different reaction of the vital powers; if, besides, experience show us every day, that children, and irritable persons, are often very dangerously affected by a very slight morbid stimulus; it will appear, that the nature of sickness must vary, in a great degree, from the different re-action of the vital powers; and as sickness itself differs in consequence of their various re-action, it follows, that the nature of sickness must depend on the manner in which the vital powers re-act. In fine, it follows also, that the essence of sickness consists in a struggle of nature,

* On this subject the work of Dr. Hufeland *Ideen uber Pathogenie*, Jena, 1796, well deserves to be consulted.

defending it's own health against the noxious powers*.

As this opinion of the nature of sickness is proved by sound reasoning, so it is confirmed by an accurate consideration of the diseases themselves. For whatever be objected to this definition will be of no weight; since no morbid stimulus can be devised to operate in our body without it's being sensible of it.—Now the morbid stimulus being perceived, it must necessarily follow, that the vital powers, incited to act by the preternatural *stimulus*, will oppose force to force, and, as it were, endeavour to fight against the morbid stimulus; or, in other words, any noxious power whatever being applied to the human body, the re-action of the vital powers must certainly ensue.

But if my opinion of the nature of sickness be founded on the observation of nature, what is to be thought of the diseases called passive?—The alleged arguments seem to prove, that there exists no distemper, strictly speaking, passive; especially, since, in diseases named passive, evident efforts of the vital powers often take place: and though these efforts be obscurely, or not at all observed in some distempers, it would be as absurd to conclude, that they do not really exist; as to infer, that the arterial vessels of a chick, during the first few days of it's evolution, are absolutely destitute of action, because

* As every one knows, that the difference of diseases depends on the difference of *stimuli* also, and as distempers are here considered only with respect to the proximate cause of death, I shall not speak of the difference of the noxious powers.

they have no systole, and exhibit no sensible motion, though the circulation of the blood is carried on: or, to make use of another example, as if any one should pronounce dead a drowned person, in whom he could discover neither pulse, respiration, nor the least motion. If we apply to the proximate cause of death what I have proved of the nature of sickness, it will be demonstrated, that it consists in the privation of the vital powers: for we have seen above, that sickness is a struggle of the vital powers with the morbid stimulus.—If now, in this conflict, the vital powers cannot repel their enemy, but, being vanquished, are forced to surrender; the equilibrium among the vital powers not only fails of being restored, but, on the contrary, life is taken away, and sickness changes into death; that is, the vital principle being destroyed, death immediately exists. The reason why life is removed seems to be, that, by the force of the noxious power, what constitutes life is abolished, that is, by it's violence the organism of the part is destroyed.—For, that the noxious powers operate by destroying the organical structure, principally appears from the phenomena, observed in a living body after applying a *morbid stimulus*: namely, there soon ensue unusual and irregular motions, which successively vary: now they are augmented, again lessened, and at last they entirely subside. But as all the phenomena, which any organ affords, depend on it's organism, it must follow, that all these unusual and irregular motions are only generated by alterations of the organical structure; and thus there are as many alterations of the organism of the human body, as there are irregular motions after the applying of the morbid

stimulus:

stimulus: in fine, it will follow from this principle, that the organical structure of the animal body, having already suffered various alterations, becomes at length entirely destroyed by the noxious stimulus; and every motion, as depending upon the organism of the parts, is totally stopped. Hence even the most dreadful poisons of the mineral kingdom, though operating with corrosive violence when applied to a living body, have nevertheless little, or no effect on a dead body; which evidently shows, that they act by destroying the organical structure of the parts. It appears therefore, that the proximate cause of death consists in the destroying of the organical structure, by the destruction of which the body is immediately deprived of life, this being owing solely to it's organism. Indeed, however far the circuit of diseases may extend, there is no distemper, in which the equilibrium of the vital powers is not, in a greater or less degree, deranged; or is there any manner of dying, in which the vital powers are not taken away: in other words, nobody ever dies but by the destruction of the organization of his body. Having treated thus far of death, and it's proximate cause, I now pass on to the consideration of the remote causes of death.

In considering the whole human body we are taught, that these causes are numerous, and very different:—for as the human body is formed of so many parts, of which each has it's proper powers, and lives it's peculiar life; and as the life of the whole body is nothing but the sum of all the vital powers, peculiar to every part of the animal body; various differences of death cannot but appear. For,
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if the universal life, or the life of the whole body, take it's origin from the equilibrium of the life of all the organs, there may be as many remote causes of death, as there exist causes, which destroy the equilibrium of the powers, on which health depends. Nevertheless the destruction of each individual part of the human body, taken separately, is not able to overturn this harmony of powers; as experience shows, that many parts of our body may be lost, without causing the destruction of the universal life.

Accordingly, it is requisite, for the extinction of the vital powers, either that the vital principle be abolished, as it were, by a single shock; or that the attack should be made on those functions, without which life cannot be sustained even in the lowest degree.

Among these injuries of functions from which follow the death of the whole body, are to be enumerated the abolition or the oppression of the circulation of the blood or of the function of respiration, the impeding of the action of the stomach and bowels, the destruction of the energy of the brain and nerves, the oppression or abolition of the action of the vessels of the lymphatic system, &c.

As all these parts are constantly requisite to the life of the whole body; no one will doubt, but that the taking away of their functions will prove mortal;—yet I have no where found mentioned a reason, at least a sufficient one, why, without these, life cannot subsist, though it is beyond all doubt, that none of
these

these directly take away the proximate cause of life.—The true reason, why the impediment of any of these functions proves mortal, seems to me to be this: that they are so many causes, without which our body cannot be properly stimulated.—This is proved by the following positions:

1. No life can exist without *stimulus*.
2. A *stimulus* is any thing, that can affect our organs.
3. No stimulus can be called universal; but all are only relative, and very different for different subjects, nay for various organs of the same individual.

AS to the first. That life cannot exist without *stimulus*, it is proved both from the state of health, and the state of sickness:—for we see, that the heart cannot exert it's function without the blood, which we know to be it's peculiar stimulus. The same may be asserted of all the other organs of our body. This is also true in the morbid state, for as long as the morbid stimulus is not removed, the cure of the complaint cannot be accomplished, but this being removed, according to the general rule “*sublata causa tollitur et ipse effectus*,” the disorder itself is in general easily remedied. Hence neither in the healthy nor morbid state does any motion exist, or is any function performed, without *stimulus*; and, according to the various stimuli, various effects also arise;—since the re-action, or, as the physiologists term it, the vital power, is in the compound ratio of the stimulus

mulus applied, and the faculty of perceiving it; which faculty depends on the organical structure of the part. Thus it appears, that *stimuli* are requisite to life, both in the healthy and in the morbid state.

As to the second. Stimuli are, in my opinion, all things that have the faculty of affecting the human body; for the celebrated Dr. Brown justly observes, that all powers that operate on the animal body have more or less of a stimulant effect, and that this may be either excessive, in due proportion, or too small. For instance, a vegetable diet, when made use of by a gentleman, who has been in the habit of living in a high manner during a long time, will bring on debility, and a predisposition to many disorders. As however many persons live only on vegetables, it must consequently still be understood to be stimulant; only so much less stimulating, as the penury of the diet is more considerable. Hence in those who are accustomed to a better fare, the stimulus of vegetable diet is too small, and not capable of supporting health. Though thus all powers operating on the living body are to be called stimuli, yet, in order to prevent confusion, we shall in future call those stimulant remedies, which act by an excessive or considerably stimulant operation; whereas such as by their weakly stimulant power communicate to the human body a degree of stimulus greatly inferior to the proper one we shall name sedatives, antispasmodics, and anodynes. It ought, however, to be remarked, 1, that as the human body undergoes various changes in different disorders, and the effects are always in the
compound

compound ratio of the stimulus applied and the reaction of the vital principle depending on the organization of the body, the same remedy, which proves a powerful sedative in one disease, in another may afford a very effectual medium of rousing the vital powers into action ; that is, it may act like a stimulant remedy, as is the case with opium in some diseases. 2dly, That their sedative effect in a great measure depends on the greater or smaller doses taken. 3rdly, That even the most powerful sedatives, as opium, cicuta, belladonna, &c., stimulate previous to their lowering the system ; but that their degree of stimulating the body is much inferior to the lowering of the system succeeding to it.

As to the third. It appears thus, that no *stimulus* can be called general ; and that the effects, which stimuli produce, when applied to bodies, are only to be accounted for by the peculiar organism of such bodies. Hence not only in different subjects, but also in the same subject, according to the peculiar modification of the organs, stimuli operate differently. The same degree of cold, being applied to two persons, will prove for the one a powerful tonic, whereas in the other, it will occasion a torpor of the vital principle : persons, who could expose themselves to some morbid stimuli without being affected, will, in general, lose that prerogative, when weakened by any cause. In the human body the different organs have different stimuli accommodated to their structure : so, for instance, light is a *stimulus* only to the eyes ; sound affects but the ears ; ipecacuanha, and emetic tartar, which do not disagreeably affect the tongue, act violently on

the stomach; purgatives stimulate scarcely any part, but the intestines; and the foxglove, which lessens the action of the heart and blood-vessels, at the same time strongly irritates the lymphatic system, and properly deserves to be called a stimulus for the absorbent vessels. This holds good not only in regard to the exterior stimuli, but, also, with respect to the interior ones; as the humours of our body, already partly or totally prepared, constitute peculiar stimuli for their vessels. For instance, the lymph irritates, that is stimulates, the absorbent vessels, and the thoracic duct; and the blood serves not only for a stimulus to the whole sanguineous system, but also acts in the secretory vessels: nay, in my humble opinion, it seems highly probable, both that every secretory organ receives a peculiar stimulus from the blood, the consequence of which is, that a peculiar humour, and very different according to the various organisation of each excretory organ, will be secreted from it; and, that all the functions of the human body ought to be explained from the peculiar perception of the stimuli, and the specific reaction of the organs. If I sum up what I have hitherto proved, applying it to the remote causes of Death, I shall have proved my thesis. For if life cannot exist without stimulus; if every thing that operates in the body be a stimulus; if all stimuli be only relative; if every organ of the human body have it's peculiar stimulus; if, in fine, all the humours serve as stimuli for their vessels; it follows, that all the above mentioned functions act as stimuli with respect to the whole body, and that the oppression, or extinction of each of them,

them, though variously, and in a different space of time, must therefore extinguish life.

The causes of Death are thus divided into the proximate cause, which, strictly speaking, cannot be distinguished from death itself, and the remote causes; which last constitute the different manners of dying, and to which are owing the various phenomena, observed in different cases during the agony of death. For, according to the different morbid stimulus, which attacks the patients; the different function, which is injured by it; and, in fine, the different constitution of the body itself; a thousand differences of death arise: and thence death sometimes destroys the human frame suddenly, at other times by slow degrees; in one man by evident and strong efforts; in another secretly; sometimes violently, and at one shock; and sometimes as it were spontaneously.

It will be very difficult, notwithstanding, to determine in all cases what has been the remote cause of death, and this will often be impossible: as the harmony, which exists among the different parts of the human body, is such, that no one function can be easily vitiated, without all the others being directly affected by sympathy: and the more, as this harmony, though very great in the healthy state, becomes much greater during sickness; both because all the parts of the human body are rendered more sensible by the morbid affection, and that, though it is perhaps nothing but a consequence of a greater sensibility, in sickness a sympathy arises also among such parts as, in the vigour of health, seem

to have no particular connexion. Such a sympathy; for instance, is observed between the kidneys and the stomach, the nose or wind-pipe, and the diaphragm, the feet and the stomach in the stone, podagra, and hysterical passion, so the perspiration being impeded, the digestion is often likewise impaired, and the appetite lessened by the strong sympathy between the skin and the stomach. The celebrated Dr. Gregory records, that sometimes pain with heat of the soles of the feet, or horrible pain of the arm during the making of urine, is observed from an ulcer in the bladder *. From the same source may be explained why the smell of roses or musk often produces the most violent convulsions and faintings in those affected with the hysterical passion: in like manner a locked jaw sometimes proceeds from the slightest wound; and an inflammation of the chest often arises by sympathy from a matter confined in the stomach, usually called vitiated bile.

It appears, therefore, how obscure the remote causes of death may very often be, and how difficult consequently it is, to reduce them to any general heads, each of which requires due limits, to prevent their being confounded together. Dr. Van Geuns is well aware of this difficulty, and after dividing the remote causes of death into combination, mechanism, and powers, he adds, that this division, as only made for the sake of order, should not be so strictly taken, as if the one were entirely independent of the others: on the contrary he asserts, that

* See *Conspectus Medicinæ Theoreticæ*, vol. 1, cap. xi, § 363.

they very often concur together*. I shall now inquire into the principles of this opinion, to enable me to draw a just conclusion whether the remote causes of death can be rightly divided, according to the opinion of this physician. Dr. Van Geuns having reduced all the remote causes of death to three principles, mechanism, combination, and powers; this opinion he attempts to prove verbatim in the following manner:—"In the first place, the solids, " in the same manner as the fluids, in as much as " they are objects of chymistry and physic, that is " as to their just combination, and union of principles, may be so altered and corrupted, that for " this sole reason they become useless to life. Or " the solids, in as much as they are objects of anatomy, that is as to their structure, connexion, and " mechanism, may be so vitiated, and impeded, " that they may become entirely unable to perform " the common functions of the economy, and, therefore, bring on death. Or, in the third place, " even the vital power of the parts, without any " remarkable vitiation either of their combination, " or structure, may be so affected, as either directly to be destroyed, or to prepare for itself, " as it were, destruction by violence and irregularity of motion†."

Thus Van Geuns has stated in this division,

1. That the combination and union of principles may of themselves be altered and corrupted; and that so a person may die from a chymical cause alone.

* L. 1. § 6, p. 7.

† L. 1. § 6, p. 6.

2. That

2. That the structure and mechanism of the parts may of themselves be vitiated, and, therefore, from a mere mechanical cause death may ensue.

3. That the vital principle may be extinguished, without any alteration of the organical structure.

With great deference to this learned physician, in my humble opinion, each of these assertions may be contradicted. From what I said above of the great sympathy subsisting throughout the human body, it might have been concluded, that these powers cannot be separately considered, much less an accurate division of them formed: besides, the doctor makes a distinction between the mechanism, and the vital powers, which evidently shows, that he, also, conceived the vital powers to be a principle super-added to the solids and fluids: an opinion which, though founded upon mere authority, was universally received at the time the doctor's dissertation appeared. Hence it will follow, that, if this hypothesis fall to the ground, the division attempted by Dr. Van Geuns must accompany it, as being founded upon it. It has already been demonstrated, that the properties, or phenomena, discovered in all organs, are only effects, showing why they are such in the peculiar organism of the parts, and in the manner of their union: thus, for instance, from the determinate union of the muscular fibres is produced a muscle, and in this a determinate power, called irritability, which differs from all the powers inherent in the other parts of the body, in the same manner as a muscle differs from the composition of all the other

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parts

parts by its peculiar organism *. Therefore, what is usually called by physiologists the vital power is, strictly speaking, only an effect of the power, that ought to be well distinguished from it's cause, properly to be called power. But, as the causes of all the vital powers are hitherto, and perhaps ever will be concealed, there remains only to inquire accurately into their actions, or effects, and by them, according to the common rule,—as the effects, such are the causes,—to determine the causes themselves.

It is thus evident, that mechanism and powers, or structure and faculties, in the human body, in ranking the classes of the remote cause of death, can by no means be separated, but on the contrary they ought always to be joined. As in the death caused by old age, and in all the diseases ranked by Dr. Van Geuns in the class of mechanism, the vital powers ought absolutely to be attended to; for it is proved, that the vital power depends on the structure of the organs: and nobody doubts, but that the organism of the human body is altered by old age; consequently this alteration must also alter the vital powers. The same is to be said of all the diseases brought into this class.

With respect to the disorders of combination, neither the solids nor fluids can be considered as mere objects of chymistry, for the action of chymical solution is impeded by the vital principle. It is true, indeed, that in some diseases, wherein, by the violence of the morbid power, the vital principle lan-

* See on this subject, my dissertation *De Causa Absorptionis per Vasa lymphatica*, cap. ii, § 1 et 2.

guishes and is deadened, the chymical powers may act more than in the healthy state; whence the propensity of the blood to dissolution in putrid diseases; but, on the other hand, it is no less true, that this chymical dissolution never takes place, as long as the least spark of life remains.

As thus during life there is no function merely chymical, no chymical laws can of course be applied to a living body without the greatest precaution. It must yet be observed, that I do not deny the influence of the chymical powers in a living body; on the contrary I willingly allow, that a living body, as well as other bodies, may be chymically affected, as many phenomena, both physiological and pathological, sufficiently prove. Thus by foggy air perspiration is lessened, and the body relaxed, as on the contrary, by dry air it becomes parched through the excess of perspiration. The disengaged caloric greatly varies with respect to the human body, in different temperatures of the atmosphere; and there needs no demonstration to prove the great influence of electricity on our bodies. However, all these chymical actions are modified by the vital principle, and operate in a very different manner, from that in which they act when applied to a dead body, that is, they are subjected to the laws of animalisation.

Therefore all chymical operations in a living body ought to be considered as compounded on the one part of the chymical powers, and on the other of what they have acquired from the animalisation or conjunction with the vital powers: such powers may thus be justly called chemico-animal. This is exemplified

emplified in the phenomena accompanying respiration: phthical patients, for instance, though they often have a great deal of the lungs corrupted, are provided with a greater degree of animal heat, than healthy and vigorous men; which shows, that the attraction of the oxygen gas, and of a greater quantity of latent heat combined with it, is not in proportion to the surface of the lungs, which comes in contact with the air of the atmosphere; but depends chiefly on the manner in which the vessels of the lungs act. But perhaps the disorders of combination may be considered in another light, namely as the primary disorders of the fluids. However if we accurately inquire into this subject, it will appear, that these disorders should not be considered as diseases, but only as effects of diseases. For the corruption of humours called putrid; the gangrene arising from the intenseness of cold, inflammation, or burning; cancer, and all other causes, which, according to Dr. Van Geuns, bring on death by the above disorders, by no means prove the doctor's opinion in the least, as the vitiated crasis of the humours in these cases, as well as in all others, ought to be looked for in the previously altered manner of acting of the solids: since, if from a preceding inflammation, from cold, poisons, or any cause whatever, mortification be brought on, it is always produced either by the torpor or extinction of the vital power; for daily experience shows, that irritability, sensibility, and all other species of vital powers are very much diminished, and at last totally extinguished, if either too powerful or too long continued a stimulus be applied to any part. It is at present generally allowed, that the secretion of purulent matter in the cancer, and that of ichor

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P A R T II.

O F D E A T H

FROM

THE DESTRUCTION OF THE VITAL PRINCIPLE.

I COMPRISE under the diseases, which bring on death by destroying the whole vitality, not only those that either extinguish it, as it were, by a single shock, or suppress it by degrees; but, also, more extensively speaking, those which, though not acting in all the parts of the body, exert their power in most of them, and thus do not break the chain of the vital powers by taking away one or two of the links; but by destroying the principal functions, or impeding their action. These diseases being thus considered, this part may be divided into the following seven classes.

1. Death from old age.
2. ——— the passions of the mind.
3. ——— either from the abundance or want of caloric.
4. ——— from the electric shock.
5. ——— different kinds of gas, noxious to the animal economy.
6. ——— Poisons.
7. ——— Universal diseases.

Although

Although this division will not be found complete in all it's parts, it may be made use of in arranging whatever I may have to say of the causes of death. I have disposed these causes in classes according to their most usual mode of acting; and I shall give occasional notice of their exceptions, as they occur.

CLASS

CLASS I.

DEATH FROM THE MECHANISM OF THE BODY
ITSELF.

GENUS I.

Death from Old Age.

I BEGIN with this, which, though it is rarely the case, that a man dies without any distemper, is nevertheless, the most natural exit of life, and late or early happens to the human body, even from the vital actions performed according to the laws of health: for our frame shares the fate of all others; man wears out by his own mechanism, and our body, by mere acting, becomes at last unfit for action. The attrition common to dead machines, however, does not exist in the living: but, on the contrary, life itself destroys them in a totally different manner. Most physiologists state three epochs of human life; the first, that of the increment or growth of the body; the second, that in which it is stationary; the third, that of decay: but, strictly speaking, there are only two, increment and decay; and indeed the seeds of decay are present from the first instant of life, so that the new born infant gives evident tokens of that death which is to ensue.

In a new born infant, the skin is very delicate, and the cellular texture very soft; the muscles are
observed

observed to be tender; the periosteum is soft, and full of vessels; even the bones, for the most part, still retain the cartilaginous state; in a word, the whole little body is, as it were, spongy, and furnished with numberless vessels; the actions of the heart and the sanguineous system are very vigorous, when compared with the action of other parts; for in our climate, during the first days after nativity, in a sleeping child a hundred and forty pulsations are counted in a minute. After birth, the child continues to grow, and increase every day, but it increases less and less, the more it recedes from nativity, and this is not wonderful; as the firm parts, acquiring more tone, and becoming stronger, oppose more resistance to stimuli, and can no longer be so easily incited to act: for that this acquisition cannot be made without the diminution of the irritability, is proved by this, that before the end of the first year, according to the testimony of Dr. Blumenbach, one of the most accurate observers of nature, in the same space of time there are enumerated only a hundred and twenty-four pulsations*. What a remarkable decrease of irritability! Such is the fate of mankind! The strength required for walking is not attained by an infant, without the irritability being in some degree diminished, on account of the increased tone of the solids; and this strength itself already leads to death, as the latin poet elegantly expresses it:

Nascentes morimur, finisque ab origine pendet.

The child still continues to grow, yet every suc-

* *Inst. Phys.* sect. ix, p. 77.

ceeding year adds less and less to it's size, in proportion as it is remote from the commencement of life: the force of the solids, and their tone increase; the imagination, and the other faculties of the mind are daily more and more developed, and the sexual instinct is excited: still no decay is observed; but on the contrary, the youth appears to increase, so much energy is there required for performing the offices, assigned to us by nature.

All the parts thus become gradually evolved, and the solids continually acquire more tone; hence a little after the youth has arrived at the term of his growth, or to man's estate, all the functions of the body are exercised with the highest vigour, and constancy; and as to the faculties of the mind, to make use of the elegant phrase of Blumenbach, "the grand prerogative of a more mature judgment belongs to this period of life;" but the texture of the brain growing partly rigid, the memory is already in some measure diminished, and the habit appears more robust and solid. For the rest, no mark of decay can be perceived, but the serpent is hidden beneath the grass: for, since the same causes continue to act, the parts, which no more admit of evolution, are daily more indurated; the vessels become more narrow, and, in fine, totally consolidated; and the muscles acquire the hardness of the tendons. But the solids being grown so stiff, it follows of course, that all the vital powers must likewise decrease: hence the nerves become more and more deadened to the impressions of the senses; the muscles obey but sluggishly the impulse of stimuli; and the irritable power of
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the heart, and of the whole sanguineous system, together with the number of pulsations, is greatly diminished; but the irritability being lessened, the blood is no longer propelled to the minutest vessels; therefore innumerable vessels are gradually obliterated, and the proportion of the fluids to the solids becomes unequal; at length, from the great alteration in the structure of the solids, the humours also are observed to be more compact and thick. This is the delineation of green old age.

But, as the same causes continue to operate, this green old age changes into decrepitude, which is attended with an arid and dry habit, increasing dullness both of the external and internal senses, and the want of longer sleep*; sexual enjoyment has long vanished; the re-action of the organs when stimulated grows sluggish, and all the functions are very slowly performed. Hence, the intestines, having almost lost their irritable power, retain for a long time the *faeces*: from the same source all the secretions are diminished and very heavily performed; the heart beats scarcely half the number of pulsations which were found in the new born infant, or even when a year old, so that in a minute not even sixty may be counted; the hair becomes gray, and partly falls off; the teeth drop out; neither can the neck sustain the head, nor the feet the body, in a proper manner, from the rigidity and insensibility of the muscles; even the bones, the supporters of the whole frame, are, as it were, consumed. In fine,

* See a very clear instance by HALLER, *Element. Phys.* T. viii, lib. 30, sect. i, §§ 22.

man is led on to the last term of all things, death, without sickness : for the human body growing more and more rigid, and the vital powers becoming in the same manner diminished, the heart and the blood-vessels can no more propel the blood to the extreme parts ; therefore, pulse or warmth can scarcely be observed in the hands and feet of decrepit men. The blood is still carried from the heart to the vessels, and back again, by which the feeble spark of life is yet fed, though just about to be extinguished, when the heart itself, having at length attained the extreme of rigidity, becomes insensible to the stimulus of the blood ; at least it can no longer be incited to a sufficient contraction, as, for want of irritability, the blood is not propelled through the lungs. Thus the left, or posterior ventricle of the heart, receiving no more blood, ceases to live ; whereas the right ventricle remains yet for a short time alive : because, after the last expiration, the blood returning by the great veins is impeded in its passage to the lungs, which are already collapsed : however, the right ventricle of the heart having attained the same degree of rigidity and insensibility as the left, after some struggles it also leaves off acting, and so complete death is ushered in. Thus, in my humble opinion, the inevitable destruction of the human frame should be derived from the continually increased tone of the firm parts, and rigidity and insensibility to stimuli thence acquired by the body. Common life proves, by numerous instances, that these alone are the causes of dying from old age, or euthanasia, and that here attrition can by no means be taken into the account. Let us only examine the hands of bricklayers, carpenters, black-

smiths, and such men; let us compare the hard-worked hands of a blacksmith with those of a fine delicate lady; how great a difference do we not find! Are the hands of this man, though continually exposed to attrition from the severest labour, more delicate than those of the lady? By no means: on the contrary, they are much harder, covered with a callous crust, and not seldom insensible even to the stimulus of fire. This is to be accounted for from the law of nature, that the more all the parts of the body are exercised, the greater abundance of blood they draw to them, and the sooner they increase; but in a short time arrived at the summit of increment, they become rigid, insensible, and unable to act. So, for instance, in the same space of time more semen is secreted in a voluptuous man, than in a chaste one, though the latter far surpasses the former in strength; the brain in those who cultivate the faculties of the mind, where all other requisites are equal, is found much more evolved than in those who neglect it's cultivation: nevertheless, rigidity and insensibility, unless prevented either by accidental causes, or by a proper regimen, much sooner happen to the cultivated parts than to the uncultivated.

I could adduce a thousand examples in support of this, were it not, that the design of this treatise does not admit of it, and the two I have published sufficiently prove it. But, perhaps, it may be argued by the advocates of the humoral pathology, that the rigidity and insensibility of the solids cannot alone be the cause of death from old age; for, if it were so, farmers and common people,

who continually exercise their bodies, would grow sooner rigid, and live shorter lives, than learned and idle men; whereas it appears, that in general they live much longer. This objection, though seemingly very strong at the first appearance, upon a nearer view proves nothing against my opinion: for the constitution of the human body being different in every individual, the natural inference must be, that the degree of rigidity requisite to death cannot be the same, and, according to the various constitutions of bodies, must greatly differ. Thus as a morbid stimulus of a certain violence is requisite for the destruction of life; but the degree of this violence is very different in various persons, so that the life of one will be extinguished by a noxious power, which in another is able to produce only a slight disease; so likewise a certain rigidity of the solids brings on death, but in such a manner, that, according to the various constitutions of persons, the same degree of rigidity in one will destroy the vital principle, when, in another, it will only occasion a slight disorder. Therefore farmers may still live in a pretty healthy state, in the same degree of rigidity, which suppresses the vital principle in men of a tender and delicate constitution. As to the consumption of the bones, called that of old age, it is beyond all doubt, that not only the small bones, as for instance, the os unguis, but also all the others, though very thick, are consumed in the state of old age, and become specifically much lighter. This phenomenon, however, is not in the least owing to attrition, but ought to be explained from another law of nature, no less general than the former, according to which all the parts, which no,

longer serve for any use, are lessened both in size and weight; the action of the absorbent vessels being incited, as soon as any living part is grown of no utility. Thus the breasts, as is known, are diminished by age. It is proved by many phenomena in nature, that this also happens in youth. The eyes of blind persons, together with their orbits, are found, even in youth, much smaller than sound eyes, and the arms and legs when rendered useless by a paralytic stroke, though the patients are in other respects healthy, and of no advanced age, are always found, if the disorder have been of some standing, arid and extenuated.

In fine, the histories of longlived men, as also the causes serving best to prolong life, confirm what I have said above on the causes of death. For though there exists no living body that can avoid death, yet there are many causes which can prolong life, or shorten it, since whatever either contracts the fibres, or acts with too much violence, brings on rigidness, and with it death:—while, on the contrary, those causes which prevent rigidness, or at least retard it's progress, ought to be looked upon as so many causes of longevity. Thus hard drinkers and voluptuous men, if they sometimes arrive at old age, grow sooner rigid than others; and for the same reason the choleric, the learned, &c. are generally found to be of short lives. Indeed it has long ago been proved, that there is no affinity between the faculties of the mind and longevity; and that, on the contrary, fools are very often longlived, which the illustrious Haller ingeniously explains in this manner; “fools want cares, and peasants are little
subject

“ subject to sorrow, who, free from the ambition of
 “ genius and dignity, neither grow lean from vexa-
 “ tion at the past, nor anxiety for the future *.” All
 these causes, though acting in a quite different
 manner, bring on rigidness: as, on the other hand,
 those who are temperate in eating, drinking, and
 not addicted to violent passions; in a word, who are
 moderate in all things, and are provided with a more
 succulent and not very irritable constitution, gene-
 rally protract life longer than others; and CORNARO,
 at a hundred years of age, has taught by his exam-
 ple, what a proper regimen is capable of effecting
 even in a weak constitution.

* L. I. p. 116.

C L A S S II.

DEATH FROM THE PASSIONS OF THE MIND.

AFTER explaining the causes of death from old age, I next proceed to treat of various stimuli, by the violence of which the vital principle is extinguished. Among these I begin with the passions of the mind; since, though they are observed without occasioning sickness in all men, yet by violence of action they become so many morbid stimuli, and thus afford a natural transition to diseases themselves. The disturbances of the mind, with respect to the effects produced in the animal economy, are divided into *exciting*, and *depressing*. To the former belong joy, love, hope, anger, &c. To the latter, grief, hatred, envy, fear, and terrour. It does not come within the compass of this treatise to speak separately of all these; since the passions in general are here considered merely as far as by their violence death is occasioned. I shall take notice therefore of three only; joy, anger, and terrour; as the others, by consuming the vital powers, in reality bring on destruction, but by no means directly extinguish life itself.

O R D E R I.

The exciting Passions of the Mind.

G E N U S I.

Joy.

THERE is no doubt, but that man can die of too much joy, since it is proved by the testimony of authors of credit, that many are carried off in such a manner; of which I shall here give some instances. Chilo, the spartan, one of the seven wise men of Greece, beholding his son crowned at the olympic games, embraced him, and in the same moment fell dead. Valerius Maximus relates, that Sophocles, a tragic poet, celebrated for the sweetness of his verses, being assigned the prize in tragic poetry, instantly breathed his last. We read in Livy, that, when Hannibal had vanquished the romans in the battle of Cannæ, two women, seeing their sons returning in good health, after they had believed them to be dead, immediately died of joy. The same happened to a lady, the heiress of the famous Leibnitz, from the joy she felt at unexpectedly finding a heap of money *. The immortal Boerhaave records, that a pirate died of joy, on being informed, that his son, who he thought had perished, was not only well, but had also been promoted to the highest dignities †.

* *Dans la Vie de Mr. Leibnitz, mise devant ses Effais de Théodicée.*

† *Prelect. Acad. de Morb. nerv. edit. Van Eems, Tom. ii, de Sympathia, p. 455, and 56.*

But it is not so easy to explain, how man dies of too great joy; as there are no dissections of such bodies, that I know of. We find indeed in the *Miscell. Naturæ Curios.* a dissection of such a body, performed by Dr. Vater; but as this author has written, that he found no unusual appearance, except that the pericardium was greatly distended with coagulated blood, nothing can be concluded as to the cause of death, from this dissection*.

Thus there remains no way of ascertaining it's cause, but by an accurate inquiry into it's nature and symptoms. No body will question, but that the sense of joy affords a grateful stimulus, the effects of which, when not immoderate, are always salutary. All authors agree, that moderate enjoyment contributes greatly to health and longevity; and that the human body reaps no little benefit from it's slightly exciting power: for the circulation of the humours, principally of the blood, thence becomes more free, the pulse quicker, and all the secretions and excretions well and quickly performed. But when this stimulus attacks unawares, and with great violence, it's effects are quite different; for the blood, then driven with the utmost rapidity through all the vessels, oppresses the heart in such a manner, that, unable to receive it on account of it's debilitated muscular power, this organ incurs a fainting fit, which therefore mostly accompanies too great and sudden joy: but, and this is the chief cause, as the blood is carried through the whole body with so great a velocity, it is also more

* *Miscell. Curiosor.* dec. 3, ann. 9, p. 293.

copiously conveyed to the brain, which, from it's delicate texture, cannot suffer such violence without the greatest injury, and the more, as on account of the languishing irritability of the heart, the flowing back from the head is impeded. It seems, therefore, very probable, that men dying of too great joy are destroyed by an apoplexy; as, by the blood's being accumulated in so great a quantity in the brain, this organ becomes oppressed, and a rupture of the vessels of the brain takes place, and in this case an apoplexy must be the consequence.

This opinion of the cause of death from joy is held by two accurate observers of nature, Haller and Gaubius; the first of whom, speaking of such a death, says: " We do not well know how it happens; yet it may be suspected, that an apoplexy is brought on, the impulse of the blood on the brain being increased; and the redness, warmth, and faintings, give room for this opinion *."

Gaubius has expressed this notion still more clearly: he tells us, that " Joy is attended not only with an increased, and quickened circulation, secretion, and excretion; but with insanity, the relaxation of the powers, and even with a mortal apoplexy when too great and unexpected †."

Thus it appears, both from the nature of the passion, and from it's symptoms, that joy kills merely by means of too great a quantity of blood oppressing

* L. l. t. v, lib. 17, sect. 11, § 5.

† Inst. Pathol. § 542.

the brain : and this is the reason, why no one dies of joy, even though extreme, when not arriving unexpectedly ; as the quality of the blood is not altered from the healthy state by this passion, which proves fatal only from the inordinately accelerated circulation, and congestion of the blood in the brain.

GENUS II.

Anger.

THE other disturbance of the mind, belonging to this order, is anger. This strong passion, totally different from joy, incites all the organs to action, not in a placid manner, but with the utmost violence : whence, even in a slight degree, it contributes nothing to longevity, but, on the contrary, is always injurious to choleric and sanguineous men ; though the venerable father of physic, and many others assert, that anger, if not too vehement, has often effected much good, by the force with which it acts on the whole body in men of a cold constitution, principally when in a morbid state, as in pituitous diseases, and palsy *. Anger, when excited in a greater degree, extinguishes the other passions by its violence, and so powerfully affects the body, that not only a bad bile is secreted, but besides the other humours are converted into poisonous liquids instead of bland juices †.

* Hippocrates *Epidem.* lib. ii, sect iv, et Horstius, lib. ii, *conf. epist.* xii.

† F. Dejean *Commentaria in Gaubii Inst. path.* t. iii, § 542, and the first part of this treatise.

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Although, from what I have hitherto said of the nature of anger, it seems right to conclude, that it surpasses joy in deadly effect, and indeed, if no greater, at least an equal number of men die by it's violence; nevertheless, in most cases it rather produces mortal diseases, than directly occasions death by itself. Anger differs thus from joy, not only as to it's causes, and manner of acting; but, also, as to the celerity of it's effect. This difference, on comparing the two passions together, may be explained thus :

Joy, though in the highest degree, never either so violently stimulates to act, or, like anger, gives so great a force to the vessels of the heart, lungs, and brain, as that they can repeatedly propel the blood: whence fainting and apoplexy are very seldom observed to arise from anger, because in this passion, the heart, and the vessels of the lungs and brain, are so irritated by receiving the altered blood, that they contract themselves with the greatest force, and repel it from the centre to the surface. The blood is thus, both in anger and joy, driven to the heart, lungs, and brain in a greater quantity: but as in anger the vessels, on account of their increased force, make the greatest resistance to the blood, and violently contract themselves at the stimulus, it is again directly conveyed to the surface.

Yet, though anger for the most part does not instantly kill, and the examples of a sudden death occasioned by it are few, it is not less injurious than joy. On the contrary, in bad effects it surpasses all the other disturbances of the mind: for it

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is proved by the illustrious Hoffmann, that, beside many other disorders of the gall-system, and the first passages, nothing can so soon excite a bilious, or a bilious inflammatory fever, as violent anger *. Besides, such fevers are very often accompanied with topical inflammations, which, being erythematous, and generally arising from vitiated bile, are much more dangerous than true ones, and sooner change into gangrene: for daily experience shows, that erythematous inflammations are more apt to terminate in mortification, than the true ones.

It is obvious, that, according to the different degrees of anger, the different constitutions of the sick, and the various afflicted organs, the symptoms must differ greatly; but, as I am considering the passions only with respect to their manner of bringing on death, I cannot take notice of these differences: I shall, therefore, directly pass on to the explanation of death from anger.

That a sudden death, though it seldom happens, may be occasioned by anger, Dr. Bruhier proves by the following example. A woman being seized with a fainting fit, in consequence of violent anger against her child, instantly expired. This case, according to the phenomena of anger, may be thus explained: In angry persons the breathing is quick, the inspirations are short, and very incomplete; as the thorax, on account of the strong spasmodic contraction of all the irritable parts, cannot be duly di-

* F. Hoffman *Opera omnia*, t. ii, part 2, *de Pathologia generali*, cap. 1, § 12, in scholio.

lated. The more violent the anger, the greater it's effects upon the organs of respiration: hence an angry person in a short time begins to pant, and can scarcely draw his breath; and if the paroxysm of anger do not cease, but be increased, or continued by any cause, the breathing becomes wholly impeded; since the blood is then so accumulated in the lungs, that they cannot sustain, and propel it, for the vessels of the lungs, being stretched beyond their tone, lose their energy, and a congestion of the blood taking place, they can no more receive the blood from the right ventricle; thus it flows back, and oppresses it; a fainting fit follows; the breathing becomes more and more impeded; and at last both from the too great quantity of blood, and it's altered quality, the breath is totally stopped; so that by a violent fit of anger the patient is suffocated.

ORDER II.

The Depressing Passions of the Mind.

GENUS I.

Terrour.

I AM humbly of opinion, that terrour should be ranked in this order, though Haller, and many others, have referred it to the exciting passions. I ground my opinion upon the symptoms of terrour, for it's main effect is a spasmodic contraction of the external parts, by which the blood is propelled from the surface to the centre: therefore, this passion throws
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the heart into palpitatioꝛ; oppresses the luꝛgs; disposes to diseases arising from the impeded secretions and excretions; produces emptiness of the vessels, weakness and quickness of the pulse, paleness, coldness, congestions, and even abortion; suppresses the evacuations; and suddenly kills *.

Nobody will question, but that these symptoms are so many arguments supporting my opinion, and upon a due examination of the objections made against it, these will be found, I think, totally groundless; for the re-appearance of the menses, hemorrhages, inflammations, diarrhœa, sudden overflow of the bile, and all the other effects, which, according to the assertion of the illustrious Haller †, are sometimes observed from terrour, ought not to be imputed to terrour alone, but to despair, a passion compounded of terrour and anger; as will appear upon an accurate inquiry into such cases, and from the nature of these symptoms itself. Thus it is evident, that, treating of the passions singly by themselves, none of the enumerated symptoms can come into the account; yet I do not deny, but that some of them, in cases wherein only a slight degree of terrour takes place, ought to be derived from the re-action of the vital powers, by which the reflux of the blood to the surface of the body is suddenly occasioned.

The other of Haller's objections does not appear to be of greater weight. It is, that terrour agitates

* Hoffman. *Opera omnia*, l. i. from § 19 to § 24.

† *Elem. Phys.* t. v, lib. xvii, sect. ii, § 6, p. 586.

the nervous system, and brings on spasms, convulsions, and even the epilepsy: for it is by no means inconsistent, that from a depressing passion should arise diseases, in which, during their paroxysm, an excess of the vital principle takes place; and the transition from the first stage of the intermitting fever to the second shows, almost every day, that this happens.

It was well known to the ancients, that sudden death is often the effect of great terrour. We read in Pliny, that Publius Rutilius instantly expired, on hearing, that his brother was rejected, when a candidate for the consulship *. Many such instances might be adduced from more modern authors; but for brevity sake I shall confine myself to two. The illustrious Lancisi relates, that “an old and
“ weak nobleman, while at supper, was sud-
“ denly carried off by an apoplexy, on unex-
“ pectedly receiving a message of the unwished for
“ arrival of one of his relations †.” The other is found in the *Philosophical Transactions*: a large vigorous dog, roused from sleep by the explosion of cannon, ran up and down till he fell dead, the blood flowing out of his mouth ‡. From these symptoms the manner of dying from terrour will not be difficult to explain: for the vessels of the surface being constricted, and the blood driven to the internal organs, it copiously rushes to the heart, lungs, and

* *Histor. Natural.* lib. vii, cap. xxxvi.

† *Opera omnia*, t. i, de *subit. mort.* lib. i, cap. xi, § 12.

‡ *Phil. Transf. Abridg.* by Boddam, vol. 3, p. 232.

brain, which thus become oppressed; therefore, if either the passion be too violent, or the body weak, the organs, unable to sustain such a shock, no longer propel the blood, but leave off acting. The more feeble any organ is than the others, the greater the force with which the blood is driven to it, and the sooner it is oppressed. Thus, though all who are destroyed by terroure die unawares, the remote cause of death differs in various persons; according as the brain, the heart, or the lungs are more weak; so that they expire either by apoplexy, by fainting, or by suffocation: yet most are carried off by an apoplectic fit.

C L A S S III.

DEATH FROM ABUNDANCE OR WANT OF CALORIC.

O R D E R I.

Death from the Abundance of Caloric.

G E N U S I.

Too great Heat.

ALTHOUGH it is at present proved beyond all doubt, that the opinion of Boerhaave *, that man cannot live in an atmosphere, surpassing in fervour his animal heat, is by no means founded on the observation of nature; as, on the contrary, it is rather one of the greatest prerogatives of man, that, confined to no zone, he can live throughout the whole terraqueous globe, and support both the rigours of *Nova Zembla*, and the scorching heat of *Senegal*: nevertheless, he is not able to bear every degree of heat; therefore in very hot countries he is extremely liable to many diseases; such as phrensy and tetanus, which are very common in those countries, particularly when a man is exposed for a long time to the scorching sun. If this heat, already excessive, be farther increased by any cause, life suddenly ceases. It is indeed true, that some men have sustained a very considerable degree of heat during a few minutes, yet there is no doubt, but that they

* *Elementa Chemicæ*, t. i, pt. altera, p. 192, L. B. 1732, 4to.

would have died, if such heat had been continued for some length of time.

But the manner of dying of such men is not so evident. If we may be permitted to conclude by analogy, from the effects of a smaller heat to its greater degree, the stimulus of heat, so favourable to the animal economy, when in a slight degree, and mildly inciting all the organs to act, in a greater degree produces quite contrary effects, operates as a sedative, depresses, and, when in any way increased, destroys life. This explanation is supported by the phenomena, which we experience during the excessive heats of summer, though living in a temperate climate: for how feeble and torpid do we feel ourselves, both in body and mind, during sultry hot weather! This opinion will be farther confirmed, on comparing the phenomena with those common to the inhabitants of the torrid zone: for their muscles are observed to be flaccid, soft, and inactive; in a word, their whole frame announces a torpor of the vital power, and the vigour of the mind decays together with the energy of the body; so that, according to the unanimous testimony of all travellers, both are scarcely capable of any thing, but voluptuousness and pleasure. If it be asked, by what means the destruction of life is produced by heat; I answer, that, from the phenomena of heat, it seems to me probable, that the vessels of the surface being deprived of their tone by the extreme heat, the blood is conveyed in a greater quantity to the internal organs, which, having themselves lost a great deal of their energy, and being scarcely able to propel the vital fluid, are entirely oppressed by the blood.

blood arriving from the surface; and cease to perform their functions. According to the various accidental circumstances, the blood will destroy the function of either the heart, lungs, or brain; yet, I think, that, on account of the delicate texture of the brain, for the most part an apoplectic fit puts an end to life.

However, it ought to be observed, that what I say here of the effects of heat is true only when moistness accompanies the hot temperature of the atmosphere: but if, on the contrary, the air be hot and dry, the inhabitants, though not strong, are active, and endowed with many faculties of the mind, and in this case they do not die of torpor, but of the stimulus of heat grown too violent to be resisted by the solids.

For want of observations I cannot determine, whether the vital principle be instantaneously extinguished in all the organs by the violence of the stimulus, or death be ushered in by the oppression of some particular organ.

GENUS II.

Burning.

WHEN the heat is increased to 212° of the thermometer of Fahrenheit, or to the temperature of boiling water, its effects are called burning. Such a degree of heat, being but for a moment communi-

cated to the body, greatly inflames it's habit, and if either this degree of heat be augmented, or the same degree remain applied during a longer space of time, the organical composition of the human body becomes entirely destroyed. But though the effects of burning greatly vary on account of the different intenseness of the heat applied, yet it's prognostic depends not only upon the degree of burning, but also upon the extent of it, so that, as Dr. Richter justly observes *, a burning of a small extent, though deeply seated, may often be unattended with danger, and, on the contrary, a superficial burning, extending over almost the whole surface, may be even mortal.

Where a man dies by burning, the cause of death ought to be looked for in the suppression of respiration, and the other vital functions, by the violence of the heat: however in most cases he is killed not by the burning itself, but by it's effects, which are either a violent inflammation, a spasm, an abundant suppuration, bringing on consumption, or gangrene, of all which I shall take notice in the third part of this treatise.

* *Anfangsgrunde der Wundarzneykunst*, erster band, das funfte capitel, § 200.

O R D E R II.

Death from the Want of Caloric.

G E N U S I.

Too Intense Cold.

AS we have seen above, that a man may die of the excess of heat, in like manner the want of a sufficient quantity of caloric can occasion death; which may readily be explained from the nature of cold itself. This, when in a small degree, acts on our bodies like an exciting stimulus, augments the tone of the solids, and the motions of the fluids depending upon it: all the functions are performed with greater effect, and the vigour of the vital principle is increased; therefore, the animal heat almost continually preserves the same degree, whether a man live in a very cold climate, or in the torrid zone; and his heat is even frequently augmented, when we are exposed to a cold atmosphere, as the energy of the vessels, which evolve the caloric, is increased by the cold. But when the cold is in a greater degree, it becomes a dreadful evil, and produces an ungrateful irritation of the nerves, a contraction of the breast, shiverings, tremblings, paleness, and rigor of the whole body. If such cold be either increased, or even continued, not only all the phenomena of the second degree of cold, as it were, are incited, so that the solids become rigid and inflexible; but also numbness, diminution and suppression

of sense and motion, difficulty and oppression of the circulation, anxiety, and, at length, an invincible propensity to sleep, the forerunner of approaching dissolution are observed: for if a man, instead of resisting the effects of this highest degree of cold by continual motion and exercise, yield to the weariness and sleepiness it induces, he is in the greatest danger of his life. Of this we have a memorable instance in some dutch sailors, who, going to the whale fishery, and being confined by the ice at Spitzbergen, remained in good health as long as as they could go out of their hut, and continually resist the cold by hunting, and other exercises; but as soon as their hut was covered with snow, and they were thus shut up in it, they were attacked with a torpor, increasing every day for want of motion, till at last all were killed by the cold.

It appears from the phenomena of cold, that the vessels of the surface contract themselves, and even collapse for want of the fluids, which are driven to the centre by violent cold: hence the deepest anxiety and palpitations of the heart ensue; the blood cannot pass through the lungs without difficulty, both on account of the inordinate motion of the blood, and because the lungs themselves are directly exposed to so strong a degree of cold. But the vital organs being oppressed by the blood, it must follow, that their functions will be impeded; as the texture of the vessels of the brain is the most delicate, and the force of the noxious power is always in proportion to the structure of the affected organ, an apoplectic fit, if not always, at least in most cases, will extinguish life; this, which might already with
sufficient

sufficient certainty be concluded from the symptoms of cold, and it's manner of acting, is confirmed by a dissection, performed by Dr. Quelmaltz, of a man, who died of cold at the age of seventy *.

* *Progr. de Frigoris acrioris in Corpus Effectibus. Lipsiæ, anno 1755.*

C L A S S IV.

DEATH FROM THE ELECTRIC SHOCK.

G E N U S I.

Too great Electricity.

IF the stimuli were to be ranked according to their quickness in destroying life, lightning certainly should deserve to be mentioned the first; for it extinguishes life not only with a single shock, but so, that, though the most powerful stimuli be instantly applied, the least spark of life no more appears in any organ, as is proved by the instance of the famous russian professor Richman, and many others*.

But the manner of dying by lightning was long involved in obscurity, because there was no way known to kill animals with a single shock of artificial electricity, as by lightning, till the learned Dr. van Marum made such experiments with the electric machine of Teiler, that there now remains no doubt of the true manner of dying in these cases; for repeated experiments taught him, that the cause of death consists in a sudden and total extinction of the vital principle. This happens not only in animals of hot blood, but also in those of cold blood,

* *Phil. Trans.* vol. xlix, part 1, p. 61,

though

though they are in other cases endowed with a more tenacious life, and the peculiar life of their organs remains many hours after death.

I shall in a few words relate some of the doctor's experiments, that it may appear, how justly he has thence drawn his conclusions. To determine this question, he made trials upon eels; as it might with propriety be inferred, that electricity would abolish the vital principle in other animals, if it could effect the extinction of life in this, as being of cold blood, and extremely tenacious of life: whereas no general conclusion could be drawn, if he had made use of animals of hot blood. The doctor made the first two experiments with eels eighteen inches long, and the electric fire was led through the whole length of the animals: after the explosion they instantly lay motionless, and though tried with various stimuli, and even with *ammonia*, they never showed the least marks of life; which proves, that the vital principle of these animals was totally extinguished by the electricity. In the other experiments, which were also made upon eels, but longer than the former, so that one of them was thirty-six inches in length, the electric shock was only led through a part of the body, after which the part not struck continued alive *, experience shows, that the same happens to a man, when the lightning has struck only a part of the body, not in the middle of the chain.

The phenomena observed in those slain by lightning, and the dissections of such bodies, perfectly

* *Algemeene Kunst- en Letter-bode*, anno 1790, N. 93.

agree with this cause of death; as no mark of any disorder is ever found, to which so sudden a death could be imputed; but, on the contrary, the brain, heart, lungs, and all the other viscera, are always observed to be either sound, or only in a slight degree injured, and nevertheless no stimulus whatever has the least effect; nay the blood is always found to be in a dissolved state, which phenomenon seems owing to this, that the vessels, deprived of life in a moment, are unable to produce it's coagulation.

Thus it appears, that the electric stimulus, though specific, and quite different from all others in it's nature, agrees with the others in this, that, exciting the vital principle, and promoting all the functions, when in a slight degree, it affords a powerful remedy in many chronical diseases, and does not seldom cure even the palsy; but, when in a stronger degree, it diminishes, and destroys life.

C L A S S V.

DEATH FROM ALL KINDS OF GAS, NOXIOUS TO
THE ANIMAL ECONOMY.

I BRING into this class all kinds of *gas*, which do not contain the due proportion of oxygen for respiration, or which, though containing it, suffocate by their peculiar stimulus. Inquiring into the manner of dying by these *gasses*, I divide this class into three orders; as they all hurt either by the superabundance of oxygen, by the want of it, or by their peculiar stimulus.

It seems to me better to constitute a different class for these kinds of gas, than to comprise them under the same class with the poisons; as most of them are mortal only by inspiration, and the rest, whether internally taken or externally applied, are by no means injurious.

 O R D E R I.

Death from Gas mortal from too much Oxygen,

G E N U S I,

Pure Oxygen Gas.

IT may perhaps be judged by some physicians, that I have improperly ranked oxygen gas among
the

the noxious species; as not only is the quality of the atmosphere commonly deemed more or less wholesome in proportion to the oxygen gas contained in it, but also the greatest naturalists, and among them the celebrated Ingenhoufsz, observing that diseased men are often relieved by a freer access of air, and by a sea voyage, have recommended this *gas* to phthifical patients, and to those attacked with a shortness of breath, or labouring under an acute fever *; in expectation, that these diseases would be totally removed, or at least greatly relieved by the inspiration of the *gas*. Experience, however, has proved these expectations futile, and the experiments made by Dr. Girtanner show, that this *gas* is not only found useless in such cases, but, on the contrary, brings on a quicker decay to the patients; for, though indeed the phthifical breathe much freer in the commencement by it's use, the hectic fever becomes thence augmented, and the sick die much sooner than otherwise †. This will not seem wonderful, when we consider, that an animal, shut up in an air pump filled with pure oxygen gas, immediately breathes much faster, the breast becomes fuller and more frequently dilated, the irritability of the heart and blood-vessels is increased; in a short time the animal grows feverish, and it's natural heat is found to be greatly augmented; these phenomena grow more and more threatening, all the symptoms of a violent inflammatory fever come on,

* Ingenhoufsz *Versuche mit Pflansen*, Theil 1, p. 373. *Wien* 1786. 8vo.

† *Anfangsgrunde der Antipblogistische Chemie*, capitel 36.

and at length the animal, incapable of breathing on account of the lungs being so much inflamed, dies of suffocation *. Thus it appears, that, as a candle, though burning in oxygen gas with a more vivid flame, far sooner burns out in it, than in the atmospheric air; so a man, making use of oxygen gas, though breathing more freely, would yet in a short time yield to the violence of the stimulus. Hence we may admire the wisdom, with which Nature has composed our atmosphere, not of pure oxygen gas alone, but also of azotic and carbonic acid gas.

ORDER II.

Death from Gas mortal for Want of Oxygen.

GENUS I.

Azotic Gas.

THIS gas, unfit for respiration, suddenly suffocates animals for want of vital air. As the proportion of the oxygen gas in the atmosphere is continually diminished by the breathing of animals, and the carbonic acid gas produced by respiration is as little able to sustain animal life, as azotic gas itself; it follows of course, that the same portion of air, often inspired, at length becomes unfit for respiration, and must bring on death. And indeed, as soon

* L. i. p. 230.

as the oxygen, contained in the atmospherical air, is nearly consumed, the lungs partly collapse for want of the usual stimulus, and are partly impeded from acting by the poisonous stimulus of this *gas*. Hence they can no longer perform their office, but suddenly desist from their functions, and death is brought on. From this we may readily perceive the reason, why the air is so often contaminated, when many persons are long shut up in a small compass. The chief antidotes against this gas are the bringing of the patients into cold air, plunging them into the cold bath, the inspiration of vital air, and the use of vinegar taken in a large quantity.

GENUS II:

Hydrogen Gas.

THOUGH this *gas* does not belong to the constituent parts of the atmospherical air, it nevertheless deserves great attention, as many men are killed by it's vapours, and still more afflicted with very dangerous diseases. Distinguished by it's inflammable property from all the others, it is much lighter than the atmospherical air, has a peculiar and ungrateful smell, and is quite unfit for the breathing of animals, and for feeding flame. It is produced by nature in many cases, though mostly joined with other substances; hence a dispute formerly arose among the chemists, whether there did not exist many species of this *gas*. At present, however, it is clearly proved by the experiments of the celebrated

brated Macquer, and Fourcroy *, that there is only one inflammable air, but which has various modifications, and is endowed with various properties, according to it's conjunction with various matters. Among these the four following, as being the most common, deserve chiefly to be noticed : viz. 1. *Sulphurised hydrogen gas.* 2. *Carbonated hydrogen gas.* 3. *Phosphorated hydrogen gas.* 4. *Hydrogen gas combined with azote and carbonic acid.* I shall briefly treat of each of these modifications, as serving to explain many phenomena in nature.

S P E C I E S I.

Sulphurised Hydrogen Gas.

THIS gas may be counted almost among the common products of nature ; for as often as water, iron, and sulphur can act on each other, in places under ground, so often is the water decomposed, and both sulphate of iron, and sulphurised *hydrogen gas* are produced : hence ought to be derived the origin of the mineral waters which contain sulphur, and that of burning mountains ; as also the explanation of the singular phenomenon, that these mountains are never found at a great distance from the sea, but always in it's vicinity ; because water is requisite to their explosion.

* *Macquers chemisches Worterbuch mit zusachen von Leonhardi zweyter theil*, p. 474, *Leipfic*, 1778 ; and Fourcroy's *Éléments d' Hist. Nat. & de Chémie*, t. ii, troisième section, chapitre iii, p. 327.

The vapourous cavern of *Pyrmont* belongs to the mineral waters containing this gas. That famous cavern suddenly kills insects, birds, in a word all animals inspiring it's vapours, with almost the same symptoms, that happen to animals deprived of the communication of the air by being shut up in the air pump *. This shows, that hydrogen gas may be united both with sulphur and *carbone* at the same time, as this cavern contains *carbonic acid* as well as the other mineral waters, and thence so great an analogy is found between it's effects, and those of the celebrated cavern called *Grotto del Cane*.

This *gas* is often produced in each of the organical kingdoms also; as many plants contain sulphur, which appears under the form of sulphurified *hydrogen gas*, when the water is decomposed into it's constituent parts by their vital power †: besides, some plants secern this *gas*, and hence the ungrateful, offensive, and penetrating smell of garlic and onions is to be explained ‡.

Sulphurified *hydrogen gas* is equally obtained by the resolution of animal parts. It is particularly evolved from the white of an egg, whence the stinking smell arising, when, in boiling eggs, a part of the water is decomposed by means of the heat applied. From the same source the human *feces* draw their smell; for it was even known to Van Hel-

* Seip *Beschr. der Pyrmont mineral. Wasser*, p. 90.

† Fourcroy, 1, 1. p. 836.

‡ Girtanner, 1, 1. capitel 35, p. 207.

mont, that the air, evolved from the aliments by the action of the primæ viæ, is, in part, sulphurised *hydrogen gas* * ; so that the *fæces* in the same animals stink more or less, according to their various aliments : the *fæces* of the cat kind, for instance, whatever be it's food, always exhale an extremely bad smell ; yet even in this tribe the smell will be more or less offensive, according to the nature of the food. In fine, this *gas* arises in the putrefaction of the animal parts, though the air thus generated belongs only in a small part to this variety.

S P E C I E S II.

Carbonated Hydrogen Gas.

HYDROGEN Gas combined with *carbonic acid* is found in many wells and caverns ; but from their combination their noxious effects are not in the least diminished. Dr. Van Geuns relates a case of a well exhaling so offensive, putrid, and penetrating a stench, that a labourer descending into it instantly lost all sense and motion, and when drawn out into the open air was seized with convulsions ; at length coming to himself after three hours, his brain remained disturbed during the whole night. Another less suddenly affected by the stink, was affected longer in his brain : both nevertheless recovered in a few days †. Though the doctor does not speak of

* *Lib. de Flatibus*, § 49, p. 405.

† *L. l.* § 52, p. 61.

the nature of this exhalation, yet it seems to me, that it may be concluded from the circumstances with sufficient certainty, that the *carbonated hydrogen gas* was the cause of these symptoms. Besides, some plants, when flourishing, secrete this *gas*; for instance, it is commonly known, that the surrounding atmosphere of the *dittany of Crete* takes fire, and burns vividly, if approached at night with a lighted candle: in fine, this *gas* is copiously evolved in the putrefaction both of animals and plants, and greatly contributes to the bad air of church-yards, and the evils produced by it.

S P E C I E S III.

Phosphorated Hydrogen Gas.

The combination of *phosphorus* with *hydrogen gas* is more seldom observed, than the former; since *phosphorus* is found only in animal substances and a very few plants. Nay, this *gas* is scarcely anywhere met with, but in the spontaneous destruction of the animal body, by which this *gas*, surpassing all other modifications by its extremely stinking smell, like that of rotten fish, is always produced. The putrid exhalations, which arise in church-yards, and in those places, where many animals lie almost unburied, ought to be ascribed in a great measure to it; yet, on the other hand, it is not to be denied, but that the horrible effects of the contagions, and many

many other complaints, which do not unfrequently derive their origin from the exhalations occasioned by the process of putrefaction in the animal body, can be explained from this *gas* alone, as little as from the others; on the contrary, it is proved by recent observations, made principally by the french chemists, that in the decomposition of animal matters there is evolved a singular, putrid, very penetrating, and intolerably stinking gas, which destroys the life of animals with the utmost violence *. The principles of this *gas* are hitherto not well known; the chemists, considering all that happens in the destruction of the animal body, suspect only, that this gas is produced by the union of *phosphorated*, *carbonated*, and perhaps also sulphurised hydrogen gas.

S P E C I E S IV.

Hydrogen Gas combined with Azote and Carbonic Acid.

SOME years ago chemists already knew, chiefly from the experiments of the celebrated Dr. Priestley, that the air exhaling from stagnant waters, and marshes, and which may be copiously collected from their muddy bottoms, in the form of bubbles, if the mud be only stirred with a stick, was *hydrogen gas*. Some chemists, however, since began to question the truth

* *Annales de Chimie*, t. v, p. 173,

of it, as this *gas* burns with a celestial blue flame, and affords no detonation; till the celebrated Fourcroy proved, that this air is not pure *hydrogen gas*, but a product of it united with *azote* and *carbonic acid* in various proportions. What great injuries may be occasioned by this *gas*, known by the ancients under the name of muddy air, sufficiently appears from the works of the celebrated Lancisi, in which, very dangerous epidemic fevers, at five separate times, are recorded, that almost depopulated different cities of the papal dominions in a few years, and were all owing to the stagnant waters, corrupted by the summer heats*. But physicians greatly dispute, whence the pestilential quality, with which marshes and stagnant waters are imbued, is derived. Lancisi collected their various opinions before his time†: all those physicians, though differing in the rest, agree in this, that these noxious effects ought to be imputed not only to the muddy air, but to the other contagions produced by it; which opinion has hitherto prevailed. Though I had at first determined to follow this general opinion, having since accurately examined into the phenomena observed here, the fact seems to me to be quite different. For historians relate, that the regions now very unwholesome, and abounding in marshes and stagnant waters, were deemed very wholesome a few centuries past: for instance, the *Campagna di Roma*, at present almost a solitude, and every where noted for it's insalubrity was formerly reckoned very salubrious, when it had

* *Opera omnia*, t. 1, de *Noxiis Paludum Effluviis*, lib. 2.

† L. 1. lib. 1.

abundance of inhabitants exercising agriculture with the greatest industry under the dominion of the *romans*. The *Pontic* marshes, which now exhibit for the most part a desert, the pestilential vapours of which are spread to such a distance, that the neighbouring countries can scarcely be inhabited, but with danger of illness, were formerly covered with inhabitants, and afforded a climate not in the least noxious. Whence so great a change? certainly not from the climate; for the *tuscans*, dwelling almost under the same climate, possess a very wholesome region; therefore, it is but reasonable to conclude, that this insalubrity arises from the marshes, produced by the neglect of agriculture, and the want of trees and other plants. But if the unwholesomeness of the air depend upon the marshes alone, the above question may be determined by an accurate inquiry into the nature of their exhalation: it appeared to the celebrated Fourcroy, on submitting these vapours to a chemical examination, that they are an union of hydrogen gas with *azote* and *carbonic acid*: it follows then, that all the hurtful effects of the marshes and stagnant waters must be owing to this *gas* alone, as the other contagions, in reality never proved by any body, seem to be the products of mere imagination.

It is by no means difficult to refute the argument, with which the supporters of these chimerical contagions endeavour to prove their opinion, namely, that these noxious powers are not always observed, but chiefly in the summer, and then mostly by night: for though the marshes always exhale *hydrogen gas* united with *azote* and *carbonic acid*, the

proportion of *azote* and *carbonic acid* to *hydrogen* is found very different, according to various circumstances. Now it is well known to the modern chemists, how different an action the same bodies, when united in different proportions, can exercise; of course it is more than probable, that these various effects arise in the summer from the altered proportion of the different kinds of gas by the increased temperature of the atmosphere. And as to the reason why the effluvia principally exercise their noxious effects by night: Dr. Ingenhoufz * ingeniously explains it in the following way, that in the day time the noxious vapours are immediately carried to the upper parts of the atmosphere, on account of the abounding caloric and the levity of the air, and thus are impeded from doing mischief; on the contrary, by night they not only fail of being raised for want of sufficient *caloric*, but those which had been raised during the day, being condensed by the cold, fall again upon the earth †.

* L. l. t. 1, 174 in a note.

† Some physicians may perhaps wonder at my not speaking of the different manners of dying by these kinds of *gas*: but as I have already stated, that all these species of *gas* bring on death chiefly by suffocation, and knowing of no observations, which mention the symptoms of men killed by them, it was impossible to take particular notice of the manner of killing of each. As to the antidotes against these varieties of hydrogen gas, they are the same as have been spoken of when treating of azotic gas.

O R D E R III:

Death from Gas mortal by a peculiar Stimulus.

SULPHUREOUS acid gas, nitrous gas, muriatic acid gas, oxygenated muriatic acid gas, carbonic acid gas, in short, all the species of gas, which are acid or alkaline, belong to this order, as they all bring on death by affecting the lungs with a peculiar stimulus, and by altering the blood in this organ. This appears from the very different phenomena, observed in animals destroyed by these different species of gas : for instance, animals are immediately killed by the *oxygenated muriatic acid gas*, whereas they can still protract life a few minutes in the other kinds of *gas*; which shows, that death happens sooner or later, according to the various modes of stimulating of the *gas*.

Although this seems to be the main cause of death; we ought to consider, that even the *oxygen* necessary for respiration is wanting. Let it not be argued, that the *oxygenated muriatic acid gas* is the most noxious of all :—for the *oxygen* abounding in this *gas* is not free, but chemically united with the *muriatic acid*, the effect of which union is, that the power of the *muriatic acid*, by which it operates both on organic and inorganic bodies, and which we call the power of stimulating when we speak of organic bodies, is increased in every respect. Therefore this *gas*, violently stimulating even by itself; must instantly suffocate, and destroy life, on it's stimulus

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being still more augmented by the *oxygen*. I cannot avoid observing upon this occasion, that the celebrated Fontana is mistaken in asserting, that all these species of *gas* bring on death only by destroying the irritability*; as the contrary is clearly proved, both by the observations of the illustrious Tissot, from which it appears, that most of these kinds of *gas*, applied to the bowels, and even to muscles, do not the least injury†; and by the dissections of such bodies made by the celebrated Bergman, which evidently show that the primary cause of death is in the lungs‡. Therefore the extinction of the irritability, observed from the *carbonic acid gas*, and some others, is not to be considered as the cause of death, but as a secondary or accidental effect of the noxious stimulus of the *gas*.

As the purpose of this treatise prevents me from speaking particularly of all these species of *gas*; I shall treat only of the *carbonic acid gas*; which species I choose in preference to the others; since man is most exposed to it's vapours, as being more frequently met with than the others, and continually generated by the respiration of animals.

* *Traité sur le Venin de la Vipère, sur les Poisons Américains, sur la Laurier cerise, sur quelques autres Poisons végétaux*, t. i, pt. i, cap. 13, p. 74.

† *Traité des Nerfs*, etc. t. 1, pt. 2, art. ix, p. 20.

‡ *Macquers chemisches Wörterbuch*, t. ii, p. 392, where the experiments made on this matter by the illustrious Bergman are recorded in a note by Dr. Leonhardi.

GENUS I.

Carbonic Acid Gas.

THIS gas, being heavier than the atmospherical air, always descends, when in a great quantity, and is found in many caverns under ground. It speedily destroys the life of animals; which, being shut up in this gas, instantly seek to escape, and suffer the greatest anxiety from the difficulty of breathing: their eyes protuberate; they fall down bereft of sense and motion; are seized with a trembling and fainting; and, if not quickly drawn out, they die, as it were overcome with drowsiness. On opening the body, the lungs are found a little collapsed, and inflamed in some places; the pulmonary artery, together with the right ventricle of the heart, the vena cava, and the vessels of the brain are turgid; whereas the pulmonary veins, the left ventricle, and aorta, contain very little blood; the irritability of the muscles is in most cases totally extinguished, so that the heart, cut out of the animal still warm, cannot be roused to act by any stimulus *. The cavern between *Naples* and *Puteoli*, called by the italians *Grotta del Cane*, has long been celebrated among the caverns filled with this aerial acid; dogs and other animals let down into it, particularly to the bottom, are either immediately killed, or drawn out with a sensible impediment of the pulse and respiration. Physicians formerly disputed very warmly on the manner in which this vapour acts. Some, as Mead and Nollet, explained it's effects solely

* Macquer, l. l.

from the air's being noxious to respiration*; whereas others, as Van Geuns and Bruhier, defended a contrary opinion†, principally making use of this argument, that a total want of air is long sustained by the indian divers, and during whole hours by the drowned, without causing death.—The very accurate observer of nature, Fontana, evidently proved some years ago, that it's vapour is nothing but *carbonic acid gas*. Thus it appears, that this gas brings on death not only by the want of *oxygen*, but also by it's peculiar stimulus: though the example of the indian divers seems to me to be of no weight; for these divers carefully stop the mouth and nose, before they commit themselves to the sea; thus retaining the *oxygen* contained in the lungs, and being able to preserve life some time without a renewal of fresh air.

As I treat here of death, from the *carbonic acid gas*, I cannot but take notice of the suffocating vapour of charcoal, which noxious and often mortal effect is chiefly owing to this *gas*: I say chiefly, since the *sulphurised hydrogen gas* is not unfrequently evolved together with the *carbonic acid*, especially from turf, of which the dutch make much use. And, perhaps, this *gas* enables us to explain why the effects of such coals are the worse, according as they contain more sulphur; because then the room is not only filled with vapours useless to respiration but the *oxygen* still re-

* Mead *de Venenis*, p. 201, and *Phil. Transf. Vol. 47*, Art. x.

† Bruhier, l. l. t. ii, p. 95, and van Geuns, l. l. p. 63 and 64.

maining in it is also attracted by the sulphur melted by the fire.

Persons suffocated by this vapour first experience a great head-ach, weariness, dimness of sight, dizziness, and sleepiness; and at length an apoplectic fit acts in conjunction with the suffocating vapour to destroy life: which symptoms shew, that the effects of charcoal are analogous to those of the *carbonic acid gas**.

The exhalations of lilies, violets, and other odorous flowers, ought likewise to be mentioned here. It was known long ago, that these kill in the same way; but their manner of acting remained undiscovered till our own age, in which the celebrated Ingenhoufz has at length demonstrated, that the exhalations of flowers are only *carbonic acid gas*, which is evolved by them in the day time, but more copiously at night. Hence the smell of flowers in rooms is observed principally after sun-set, and their fatal effects then mostly take place. There are many instances of a sudden death occasioned solely by a too great quantity of flowers, inconsiderately placed in a small room. Dr. Ingenhoufz relates a case of a woman found dead in bed, the cause of whose death could be imputed to nothing but a too great quantity of lilies placed in her chamber†. The learned Triller mentions, that a girl seventeen years of age, enjoying excellent health, died of the too strong smell of violets; and a

* The Drs. van Geuns, l. l. 57 and 58, and Unfer, *de Artz*, t. i, Art. 39, p. 286, relate many instances of men killed by such vapours.

† L. l. t. i, lib. i, p. 69, art. xv, & lib. ii, art. ii.

similar case happened at *London*, in the year 1764, when the lives of the women were however saved*.

It serves greatly to confirm what I have above said of a peculiar stimulus, that this *gas*, so noxious when inspired, may yet be taken in with beer, mineral waters, and with almost all the aliments, every day, in a large quantity, without the least detriment. The antidotes counteracting the noxious effects of this gas are the bringing of the patient into the atmospherical air; the application of caustic volatile alkali to the nose; and the rubbing of the body with spirit of lavender, and similar spirituous remedies.

As thus the *carbonic acid gas* is continually generated by the respiration of animals, by the combustion of *carbone*, and by the putrefaction of organic bodies, while on the other hand the *oxygen gas* is attracted from the atmosphere, the air would in a short time become wholly useless for respiration, if nature had not provided means, by which the atmosphere could be again purified from the abounding *carbonic gas*. These means are the plants, by the vegetation of which the *carbonic acid gas* is attracted out of the atmosphere, and resolved into its constituent parts; the *carbone* passes into the substance of the plants; the *oxygen*, on the contrary, is exhaled like an excrement in the form of *gas*. Nay the plants do not only purify the air in this manner; but they also attract water, both from the atmosphere and the earth, and decompose it: the *hydrogen* of this water concurs with the *carbone* in forming the oils.

* Triller's *opuscula medico-philologica*, vol. i, diss. non. p. 237.

and refins of the plants, while the *oxygen* of this also flies off in the form of air.

This is further demonstrated by what follows.

1. Plants in the highest degree poisonous discern pure *oxygen gas* as well as others*.

2. The most common plants, as, for instance, the whole tribe of grasses, and all others, which rise spontaneously on the surface of the earth, afford the largest quantity of *oxygen gas* †.

3. The above plants are such as are vigorous till the end of autumn, and the vegetation of which is incited the soonest in the beginning of spring; thus they are capable of performing their destined functions almost during the whole year.

4. The vegetation of plants greatly increases in the summer, when putrid and mephitic exhalations infect the atmospherical air in a greater quantity, on account of the increased temperature. Now the effect of this augmented vegetation must be, that the plants exhale a greater quantity of *oxygen gas*, and consequently almost the same quantity of it is contained in the atmosphere during each of the seasons.

5. The vegetation of plants growing in the countries under the torrid zone, where the air is much

* Ingenhoufs, l. l. vol. ii, art. 31, p. 191 and 192.

† Senebier *Mémoires physico-chimiques*, t. i, §§ 41.

fooner corrupted by poisonous effluvia, attains the highest degree of perfection, so that the plants of such countries do not only attract *carbonic acid gas*, with great eagerness, but also secern such an abundance of pure oxygen *gas*, that the small quantity afforded by the plants growing in the temperate zone can by no means be compared with it. If we attend to these subjects, how wisely do we find that all is ordained! For not only do the plants contribute to the support of the animal economy by attracting *carbonic acid gas*; but, moreover, what proves fatal to the animal body is absolutely requisite to the vegetation of plants; and, according to the proportion in which the *carbonic acid gas* is exhaled from the one organical kingdom, it is more or less eagerly taken in by the other; and thus the disturbance of the equilibrium of the various species of gas, of which the atmosphere is composed, is effectually prevented*.

* All this confirms the opinion, that the want of agriculture must greatly contribute to render a climate unwholesome.

C L A S S VI.

DEATH FROM POISONS.

BY poison I understand, with the illustrious Gaubius, whatever, in a very small quantity, either internally taken or externally applied, exerts effects tending to destroy animal life*. This definition of Gaubius, though rather a description of an effect common to all poisons, than a definition of them, seems to me to be the best hitherto made; both because the definitions of other authors are less accurate, and that I every day become more and more convinced, that it is impossible to lay down a general definition of poisons. For not to mention, that all poisons are mostly relative, so that some, which are very noxious with respect to the human body, serve other animals for nourishment: as, for instance, mules and goats eat the white hellebore, and quails feed upon the seeds of the *lolium temulentum*, without any injury†; no absolute dose can be determined even with regard to the human body, to which, and no farther we may proceed; since the medicinal and poisonous properties are converted one into the other by a little variation of the quantity, so that the same dose, which recovers one from

* *Inst. Pathol.* § 486.

† Gmelin's *Allgemeine Geschichte der Pflanzengifte*, ord. i, art. i, p. 426 and 432, and Plenck's *Toxologia* p. 10.

a very obstinate disease, extinguishes life in another; an evident proof, that no accurate measure of the quantity, in which poisons are injurious, can be laid down, but that the dose must be different in various individuals, according to their different constitutions. But if poisons be hurtful to the body, into which they are received, according to their quantity alone, perhaps all poisons, when taken in a proper dose, would have salutary effects: and, on the contrary, all remedies might be called poisons in a certain sense; for all medicines, when administered in too large a dose, prove noxious. I know, indeed, that there are substances, which, in whatever dose they may be given, almost always injure: but I know likewise, that modern physicians have exhibited some of them with success, which leads me to expect, that the rest may one time or other be also converted to the use of mankind.

Be this as it may, it suffices to have shown, what substances are named poisonous by us. As such are found in all the three kingdoms, I shall divide this class into three orders: in the first of which I shall treat of the poisons of the animal kingdom, leaving those of the vegetable kingdom for the second; I shall speak of the mineral poisons in the third; and a poison, the nature of which is hitherto not well known, shall form the supplement to this class.

O R D E R I.

The Poisons of the animal Kingdom.

THESE poisons may be reduced to two kinds, according to their difference of operating; the one of which contains the poisons, which bring on death principally when communicated to the body by a wound; the other, such as chiefly exercise their noxious power, when taken internally.

G E N U S I.

Poisons bringing on Death principally by Means of a Wound.

S P E C I E S I.

The Viper.

PHYSICIANS did not agree respecting the nature of the poison of vipers, till within a few years, when the ab. Fontana published his work, containing, among other objects, many experiments on this poison; by which it appears, that it is a viscid substance, like the mucilage of gum, and that this humour, secreted by peculiar organs under the root of the canine teeth, is poured into the wound during the bite of the viper*. This poison, according to the numerous observations of Fontana; does not hurt every species of animals, as the other ser-

* L. l. t. i, cap. ii, p. 10.

pents, tortoises, and polypes are not affected by it ; but it proves mortal to man, and many other animals. Received on the tongue, it does not inflame, but impresses on it the sensation of an astringent substance during some hours ; if swallowed, it injures only when taken in a large dose ; it may be externally applied to the skin, cellular membrane, tendons, and even to the nerves, without occasioning death ; but when communicated by a wound, it kills even in a small dose. The symptoms of this poison are the following : pain of the afflicted part ; an extensive inflammatory swelling arising from the humours carried to it by the vital powers, to obtund the sense of the poisonous stimulus, whence an extravasation of black blood, and a livid colour of the bitten part, are always observed ; afterwards shivering, paleness, anxiety at the præcordia, a weak, unequal, intermitting pulse, palpitation of the heart, faintings, cold sweats, convulsions, and drowsiness ensue, soon terminating in death, if help be not quickly afforded.

The time requisite to the noxious effects of this poison is different, according to the various species of vipers, and to the different constitutions of the animals bitten ; yet these effects universally manifested themselves in the animals, on which Fontana made his experiments, within a few minutes ; but if the part injured were immediately amputated, the animals remained free from all these symptoms* ; which shows, that the whole body is not instantly affected, but that a certain time is re-

* Fontana l. l. tom. 1, pt. 3, cap. 2.

quired for communicating the topical disorder to the other parts of the body.

But how is this poison communicated to the body? By the lymphatic system. This seems to the ab. Fontana improbable, as it may be applied without the least danger to the nerves, skin, tendons, and muscles; all of which are furnished with lymphatic vessels*; and if the trunks of the absorbent system be tied, it exercises, though slowly, its noxious power†. Neither does it operate by means of the nerves; for the poison, when directly applied to them, does not produce the least effect, and kills as certainly as before, when the nerves are tied or cut‡. Perhaps the communication may then be performed by the blood vessels? By no means: for the poison brings on death, when the circulation is previously impeded, or the blood vessels of the bitten part are cut, so that the communication between the vessels of the affected part and the rest of the body is completely interrupted; the effects of the poison are only retarded by this operation§.

But if this poison operate neither through the medium of the lymphatic system, the blood, nor the nerves, what can be its manner of acting, and the cause of death?

Fontana, on finding the blood always coagulated in the animals killed by this poison, conceived the opinion, that it acts directly on the blood, and coa-

* Fontana, l. l. p. 145.

† Fontana, l. l. p. 303.

‡ Fontana, l. l. p. 268.

§ Fontana, l. l. p. 299.

gulates it; and that the effect of this coagulation is the abolition of irritability, by extinguishing which death instantly ensues*.

With the greatest deference to the talents of Fontana, I cannot coincide with this opinion, and even his own experiments dissuade me from agreeing with him: for though the blood is always found coagulated in the vessels, nevertheless, drawn out of the vein of a living animal, and mixed with this poison, it does not coagulate: on the contrary, the coagulation of the blood is prevented by it's mixture with this poison †; which clearly proves, that the coagulation of the blood ought to be derived not from the immediate contact of the poison, but from the peculiar action of the solid parts on the fluids: for the solids, being incited to inordinate motions by the poisonous stimulus, act on the fluids in an unusual way, by which such an alteration is produced in the blood, that it's red colour is converted into black, which explanation is besides confirmed by all the symptoms of the poison.

As to the manner of acting of this poison, notwithstanding the arguments of Fontana, it seems to me highly probable, that this poison is attracted by the absorbent vessels, and by them communicated to the blood: for this poison at first acts topically, and afterwards produces a general affection of the system: but there exists no medium of communication, except the lymphatics, the nerves, the blood-vessels, and the cellular membrane; and Fontana

* Fontana, l. l. p. 318, and the following.

† Fontana, l. l. p. 305.

has proved, that it does not act by means of the cellular membrane, the blood vessels, or the nerves; whence it necessarily follows, that the poison is communicated to the system by the lymphatics. This opinion is also favoured by the analogy between the poison of vipers and other poisons, as those of a mad dog, the small pox, &c., which are doubtless communicated to the animal body by means of the absorbent vessels: besides, the experiments of Fontana do not prove to the contrary: he tied all the lymphatic vessels that he could find, and yet death followed, though more slowly. But if we consider the great number of absorbent vessels, which exist in all the parts of the human body, and that their orifices conceal themselves from the eye even when assisted by glasses, it seems to be very difficult to put a stop to all communications between such small organs and the other parts of the body with a ligature; not to speak of those absorbent vessels, which lie so deep, as to bid defiance to all our skill in tying. Besides, Fontana seems to have been mistaken in making these trials; for the celebrated professor Soemmering asserts, that, from his experiments, this poison appears to operate by the lymphatics*. The other argument, namely, that this poison may with safety be applied to the skin, cellular membrane, tendons, nerves, and even to muscles, if it really be true, proves at best nothing more, than that the absorbent vessels of these parts are not able to suck in the poison, and, by no means, that it is not propagated by absorption: for it seems highly probable, that the structure of the absorbent vessels varies in different parts of the body. It follows then, that

* De Morb. Vasoꝝ, absorb.

the absorbent vessels of one part may be able to take up a liquid, which those of another part are altogether unfit to imbibe: in fine, as the orifices of the absorbent vessels are provided with a faculty of rejecting noxious matters, and only absorbing such as are beneficial; for a poison to be taken up by the orifices of the absorbent vessels, it is requisite, that an affinity be first generated between it and the lymphatic system; but after the radiated extremities of the lymphatics are destroyed by a wound, their trunks appear to absorb better than the original orifices, of which we have a striking instance in the absorption of the venereal poison: “venereal
 “matter; having produced an ulcer, is almost im-
 “mediately absorbed; whereas, had the matter
 “been applied to the original orifices, it might
 “either not have been absorbed at all, or not till
 “after a considerable period*.” The manner of dying from this poison is, I believe, to be explained in the following way. The poison, being communicated to the blood by the absorbent vessels, violently operates on the sanguineous system; the vessels affected react on the blood, and destroy it’s crasis; the altered blood, *vice versa*, acts upon the solids, which are thus incited to action with the utmost violence; but, unable to sustain such a shock, they cannot well perform their functions, and soon languish: hence ensue palpitation of the heart, a fainting fit, and the symptoms of an approaching apoplexy, from the retention of the blood in the brain; these phenomena continue, till at length, the organical structure being entirely destroyed by the continually irritating stimulus, death puts an end to them.

* W. Cruikshank’s Anatomy of the absorbent Vessels, p. 114.

As to what belongs to the coagulation of the blood, in my humble opinion it should not be deemed an essential character of this poison, but merely accidental, as in death from many other diseases; and the more, as, on the contrary, the blood is found dissolved in those bitten by american vipers, at least by some: for these species of vipers agree with the others in almost their whole economy: therefore all, that I have said of the former, *mutatis mutandis*, is also true of the latter. The poison of the *american* vipers however proves fatal in a much smaller quantity, and often kills in less than five minutes, to which quick extinction of universal life this dissolution of the blood seems to be owing. As to the antidotes against the poison of the viper, the bitten part, when practicable, is to be removed either by excision, or cautery, and afterwards the wound is to be well washed with a slight solution of the *lapis causticus*, in order to prevent the poison from being absorbed. Inwardly, saccharum, oleum olivarum, radix serpentariæ virginianæ, radix belladonnæ, milk, and ammonia preparata, are to be given; which medicines, especially the ammonia, have sometimes proved useful, though, to say the truth, a specific against this poison is hitherto unknown. All this is to be understood of the vipers in hot climates; for the bite of these animals in cold and temperate countries does not occasion so much mischief, and of course the removing of the bitten part is not necessary.

S P E C I E S II.

The Insect called Furia infernalis.

THIS insect, nearly two lines in length and met with in the northern regions, principally from the summer till the winter solstice, inserts itself into the uncovered parts both of men and cattle, leaving behind it a small, dark, often black, and extremely painful spot. If the whole insect be not extracted, this spot quickly spreads like a sphacelus, occasions acute fever, and destroys life with the most excruciating pains in the course of a few days, and often even in a few hours*.

The cause of death ought to be explained from the poisonous stimulus, which, violently affecting the body, brings on an inflammatory fever, that, like the spurious inflammation, in a short time inducing a dissolution of the powers, kills by the extinction of the vital principle; or, to speak more clearly, the patient is carried off by the too great violence of the stimulus.

S P E C I E S III.

The Bite of mad Animals.

OF these I shall only treat of the bite of a mad dog, both because the madness of this animal, at least in temperate climates, is of more common occurrence, and the bites of the other animals, as

* Callisen *Principia Systematis Chirurgiæ hodiernæ*, t. 1, pt. ii, ord. 3, cap. i, §§ 1009, p. 510.

to their effects, mostly agree with that of a mad dog.

The following phenomena are sooner or later observed in persons bitten by a mad dog, according to their various constitutions; a painful sensation of the affected part, weariness and heaviness, slight unrefreshing sleep, the patients afterwards become gloomy, sad, pensive, anxious and passionate; they seek for retirement, the appetite is diminished, the swallowing of liquids grows difficult; they are afraid of water, if they attempt to drink they are violently convulsed, and they are frightened even at the sight of a fluid*; sometimes they vomit black bile, and a desire of biting is observed in them; the body is in a continual agitation, a priapism, and hoarseness come on; at intervals they labour under the most dreadful convulsions; at length cold sweats, palsy, and a relaxation of all the powers, succeed as forerunners of approaching dissolution.

These are the usual symptoms of this horrible complaint, from which alone we can attempt to explain its nature, as the dissection of such bodies throw no light upon the subject. On considering them, it seems to me, that the manner of acting of this poison may be explained in the following manner; viz. The poisonous saliva of the dog, poured into the wound, is applied to the absorbent vessels; these nevertheless do not absorb this acrid matter, because their orifices possess a faculty of taking up only suitable matters; thus the poison remaining applied

* I have seen two instances, in which the patient could easily take every thing that was solid; whereas attempting to swallow any fluid he became immediately seized with strong convulsions.

to the lymphatic vessels, and continually stimulating them, the effect of this sharp stimulus can be nothing less than the progressive alteration of the composition of the stimulated part. Now, as the change of composition in every organ, is always in the compound ratio of the structure and the stimulus applied, an affinity must necessarily arise between the stimulating poison and the degenerated absorbent part, which being effected, every poison is attracted by the lymphatic system*. Thus as long as the requisite degeneration of the absorbent part does not take place, so long the poison lies without effect, and no marks of illness appear, which instantly manifest themselves, when the necessary affinity is brought about; for as soon as the poison of a mad dog is absorbed, pain, tumefaction, and itching of the affected part, weariness and melancholy are observed; this is the first stage of the disease, which passes on to the second, when the poison enters the blood: and indeed the whole mass of blood being infected, the difficult swallowing of liquids and the hydrophobia are directly observed; in a word all the other symptoms then arise.

The phenomena produced by this poison not only agree with this opinion, but analogy greatly favours it; as other poisons, such as the small pox and measles, which are doubtless absorbed, exhibit analogous symptoms at the time of their absorption. For instance, let the poison of the small pox be communicated to a child by inoculation, the wound will soon be healed, and the child will seem to be as

* See my dissertation *de Causa Absorptionis*, cap. ii, § 10, where I particularly treat of this matter.

well as before: an itching, tumour, and pain of the afflicted part, together with the swelling of the axillary glands, will however arise within a few days, if the inoculation succeed well; the child will likewise complain of weariness, and heaviness, which, according to the opinion of all physicians, are so many tokens, that the matter is absorbed. But if all physicians agree, that these phenomena signify the absorption of the poison in cases of the small pox, why should not analogous symptoms denote, that the same thing takes place in the poison of a mad dog? In fine, there are observations which directly prove, that the poison of a mad dog is communicated to the sanguineous system by the absorbent vessels. For Hunter and Cruikshank have observed swelling, pain, and inflammation of the glands of the axilla, and of those of the groin, and streaks going up from the wound to those glands after the bite of a mad dog; and Tode has demonstrated, by a remarkable example, that this poison, though only applied to the skin without the least wound, may yet sometimes be absorbed, and bring on death*.

Notwithstanding, Richter, and many other eminent physicians, are of a contrary opinion: and, though they agree, that at length this poison affects the sanguineous system, they nevertheless contend, that all the symptoms of the first stage of the disease should be imputed wholly to the sympathy of the nerves†. But, with submission to these illustrious

* Soemmering *de Morbis Vasorum absorbentium*, p. 65 and 66.

† Richter, l. l. t. i, *capitel* 15, § 417, Callisen, l. l. § 1020, p. 515. R. Vogel, *Prælect. acad.* p. 751, and Plenck, l. l. p. 68, in a note.

physicians, if their opinion be founded on the observation of nature, why does not an extirpation of the injured part, in the first stage of the disease, cure? If the disease in the first stage be still topical, and all the symptoms should be derived only from the sympathy of the nerves, why does the disorder perform it's course and terminate in the usual way by death, though the bitten part be cut out? Let it not be argued, that the efficacy of nervous remedies in these cases supports this opinion: from this no argument can be drawn, for nothing is more certain, than that many medicines, called nervous, do not directly affect the nervous system. When speaking of the vegetable poisons I shall demonstrate this with regard to *opium*, and I could easily prove the same of many others, were it not foreign to the design of this treatise. The manner of dying in this disease ought to be explained in the following way. The wretched patient is agitated with the strongest convulsions, which are succeeded by a torpor of the vital powers, from which source the lucid intervals of this distemper are to be derived; yet the poisonous stimulus continually operates on the solids, repeatedly producing convulsions, by rousing them into action, and so the vital principle struggles for some time against the noxious power: but as the organs are not long able to sustain such attacks; and the less, as their energy is not restored by nutritious substances, at length an universal relaxation of the system succeeds to the convulsions, a cold sweat and palsy ensue, which soon terminate in death. A remedy counteracting this dreadful poison has long been desired. Mercury and opium in large quantities, musk, and camphor, though

though perhaps they have afforded relief in some cases, generally prove inefficacious. Some years ago, however, professor Richmon, of Bonn, published a work on the treatment of hydrophobia, in which he has proved, by a great number of observations, that the root of the deadly nightshade not only always prevents the disease from coming on, when used before the symptoms takes place, but that, even in many cases, in which the patients are already seized with the hydrophobia, the malady is removed by using this medicine, though this author does not deny, that the disease, when it has continued some time, often proves fatal*.

Before I pass on to the other genus of this order, I must state a question, whether the fatal effects of this poison, like that of the viper, take place almost solely through the means of a wound. Indeed the affirmative is not only favoured by analogy, but also by a singular case, related by the learned van der Haar; viz. that a man enjoyed his wife only one hour before she was seized with a hydrophobia, without being in the least injured in his health; besides van der Haar asserts, that the poison of a mad dog is only deadly by a wound, and that the saliva of a mad person may be swallowed without danger†: however, as many authors have observed the contrary, and as even the poison of vipers, swallowed in a greater quantity, as, for instance, as far as thirty drops, suddenly kills‡; and the dose which may be taken with safety cannot

* *Handelingen van het Utrecht. Genootschap der Weetenschappen*, 8 deel.

† *Chirurgische en medische Waarneemingen, Waarneeming 137.*

‡ Fontana, l. l. t. ii, in SUPPLEMENTO, p. 307.

be exactly determined; it seems to me, that the swallowing of the saliva of hydrophobic patients is attended with danger.

GENUS II.

Poisons bringing on Death, principally when swallowed.

SPECIES I.

Cantharides.

THE powder of these insects, when taken in some quantity, excites thirst, a taste of pitch, nausea, vomiting, the most violent pains in the stomach, præcordia, and hypochondria, especially on the right side, inflammation of the primæ viæ, priapism, strangury, a stoppage of the urine, bloody urine, often a bloody flux, sphacelus of the stomach and bowels, and death.

With respect to the manner of acting of this poison, and it's way of causing death, Dr. Forsten thinks, that this poison enters the blood, and is conveyed with it to all the parts of the body; besides, he is of opinion, that cantharides dissolve the blood, and lessen it's cohesion: because this phenomenon is observed when their powder is mixed with blood out of the body*.

This opinion, however, seems to me, to be attended with some difficulties. In the first place, can it be believed, that, if in reality the acrid poison of cantharides had infected the whole mass of blood, ne-

* *Act. servandis Civib.* t. 1, p. 266.

vertheless almost all patients would be restored to health by proper remedies, though the disease had already manifested itself, as the cases related in the doctor's dissertation prove *? Is it not much more probable, from the elective power which the *orifices* of the absorbent vessels enjoy, that this poison does not enter the sanguineous system?

2dly, A woman, who had vomited up almost all the poison a short time after she had swallowed it, by making use of an emetic, had, notwithstanding, bloody urine and the other symptoms, with the usual violence: which shows, that this poison acts chiefly on the nerves, impresses on them the morbid character, and therefore the inordinate action of the nerves does not cease, though the poisonous stimulus be removed, but continues till this morbid character impressed on the nerves is abolished.

3dly, Those phenomena, which take place when cantharides are mixed with the blood out of the body, prove nothing with respect to their action in the living body: as it appears, from what is above shown with regard to the poison of vipers, that such experiments in a living body often produce quite contrary effects.

Therefore it seems more reasonable to conclude, that the poison of cantharides never enters the blood, but only operates on the *primæ viæ*. Thus the death occasioned by it should be attributed to sphacelus of the stomach and bowels, which succeeds their inflammation; and the disorders of the

* L. l. p. 272.

urinary system are to be explained from the sympathy existing between the *primæ viæ* and the urinary organs. The antidotes against this poison are an emetic and a gentle purgative, in order to expel this noxious substance from the body; afterwards milk, saleb, and an emulsion of gum arabic, in conjunction with camphor, complete the cure.

The may-bug and *proscarabeus* agree with cantharides both in manner of acting and cause of death: at least authors relate, that death may be brought on by their use*. Yet their noxious power seems to act less violently; since Dr. Oslander has proved, by an instance of a woman, who was filled up with a quantity of different insects, that they may remain for a long time alive and vigorous in the human body without causing death†.

ORDER II.

Vegetable Poisons.

THE poisons of the vegetable kingdom are reduced by Dr. Plenck to three kinds; viz. narcotics, acrid narcotics, and acrids; which division I shall employ, as most agreeable to the phenomena of nature. The design of this work prevents me from treating of all the poisonous plants; I shall select

* Plenck, l. l. p. 43.

† *Gedenkwürdigkeiten für die Heilkunde, und Geburtshülfe*, t. 1, art. 1.

therefore

therefore only two plants of each kind, and having mentioned the phenomena which they commonly occasion, I shall add their manner of acting, and the cause of the death they produce, as far as is in my power; although it is not to be denied, but that the manner of acting of many poisonous plants is wrapped up in obscurity.

GENUS I.

Narcotic Poisons.

SPECIES I.

Opium.

AUTHORS have long disputed on the action of opium in the human body, without it's being decided, to which of them the palm is due. As the experiments of some are opposite to the observations of others, it seems to me eligible, to pass them all over, and proceed directly to the phenomena observed both from a small, and a large dose of *opium*; and having accurately inquired into these, to consider how far they may serve to explain the manner of acting of opium, and the cause of death from it's abuse. Opium, taken in a small dose, by it's stupifying power renders the mind calm and cheerful, and dispels all fear; hence the eastern nations have the custom of taking opium to acquire audacity, and to exhilarate the mind: it farther incites

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the action of the sanguineous system, and greatly accelerates the circulation: it acts with no less power on the genital parts; for it stimulates them with such vehemence, that even old men, otherwise strangers to venereal pleasures, are not callous to its power, and the erection of the penis remains even after death in those turkish soldiers slain in battle, who have previously swallowed opium*: in fine it increases perspiration, accompanied with itching of the skin; suppressing on the contrary all the other excretions. The grateful sensation excited by opium, however, does not long continue, for it ceases within four or five hours; a torpor, and sleepiness succeed, which often remain during a long time†.

But if opium be taken in a large dose, these grateful sensations do not appear; on the contrary, it then stupifies the nerves, and enfeebles their powers so much, that instances are not unfrequent of the feeling, sight, hearing, and the other senses being thereby taken away: hence stupor, dizziness, sleepiness; insensibility to all external impressions, and a stoic behaviour even under the most cruel torments. A great dose also renders men incapable of coitus, and equally destroys the irritability of the muscular parts, as the languor of the stomach and bowels, the great diminution of their peristaltic motion, and the immobility of the knees clearly show: yet a substance so noxious both to the muscular and nervous power proves a potent stimulus to the sanguine-

* Murray *Apparat. Medicam.* t. ii, p. 282.

† Gmelin, l. 1, p. 470.

ous system, and extremely augments the frequency of the pulse, together with the heat of the body; so that the breathing becomes quicker and more difficult, the blood vessels grow turgid, a redness and swelling of the face arise, a heaviness in the head, and an accumulation of blood in the brain ensue; and these phenomena are sometimes attended with delirium and phrensy, and a *snoring* respiration: at length a mortal apoplexy is produced, either from the brain being oppressed by too great a quantity of blood, or from an effusion of the blood occasioned by a rupture of the vessels.

From these phenomena, which are always observed in persons killed by opium, the following inferences may be drawn:

1. That the opinion of Dr. Alston *, according to which opium lessens the power of the sanguineous system, is refuted by daily experience; and that no conclusion can be drawn, with regard to mankind, from experiments on animals, which trembled under the anatomical knife, and had already suffered such great torments.

2. That the opinion of Dr. Whytt †, according to which the opium exerts its power only on the nerves of the stomach, is not founded on the observation of nature: for it does not act before it is at least partly absorbed and has entered into the blood; as is proved, not only by the manner of acting of opium, which

* *Medical Essays and Observations*, t. v, part i, art. x, p. 112.

† *Whytt's Works*, p. 307 and the following.

does not kill till after some time, but also by the sweat not unfrequently smelling of opium *.

3. As opium affords a stimulus, which, while it acts on the brain and muscles with a narcotic power, at the same time incites the functions of the sanguineous system; its action demonstrates, both that the function of the sanguineous system does not depend upon the nervous power, and that the same stimulus does not always affect all the irritable parts in the same manner; but, on the contrary, often produces in them opposite effects, according to the different mode of union.

4. Though no doubt opium operates on the brain, yet it by no means follows, that this poison directly affects the nerves; on the contrary, the celebrated Fontana has proved, by a great number of experiments, that opium, when applied to the bare nerves, does not produce the least effect †, from which it appears, that the nerves are attacked not primarily, but only secondarily by opium.

5. As, thus, strictly speaking, the nervous system is not affected by opium; but the brain, when injured by the taking of opium, also affects the nerves themselves by sympathy; it follows, both that the nerves possess their peculiar powers, which are quite different from the energy of the brain; and that the brain itself may sometimes be affected by means of other parts, as well as by the nerves: therefore the:

* Murray, l. 1, p. 284.

† T. ii, Supplement, p. 355.

nerves are far from being primarily affected in all the diseases called nervous.

6. As, though, according to modern anatomists, the internal coat of the blood vessels is entirely destitute of nerves, yet convulsions arise from an injection of opium into the veins^{*}; and as the same phenomena take place, when the nerves of that part, in which the experiment is made, are cut, either at their origin, or in their course[†]; it follows, that convulsions do not always constitute a proof of the nervous system's being affected; but are sometimes owing either to a disturbance of the equilibrium between the antagonist muscles, or to the inordinate action of the sanguineous system.

The noxious effects of this poison are to be prevented by an emetic, which removes the poison when still remaining in the stomach, and, by shaking the whole system, diminishes the propensity to sleep; by keeping the patient from sleeping by continual exercise, by making a great noise, and by forcing him to walk about; and by drinking large draughts of coffee, mixed with lemon juice.

As to the cause of death from opium, it appears from the symptoms occasioned by this poison, that opium vehemently excites the circulation; the vessels thence become turgid, and, though their action is still excited by such a dose of opium as diminishes

^{*} Fontana, l. 1, t. ii, p. 361.

[†] *Monro's Essays and Observat. phys. and liter.* t. iii, art. xiii, exp. 14, p. 334.

the irritability of the other parts, nevertheless at length the vessels themselves, growing languid from the violent stimulus, do not duly perform their functions; the blood vessels of the brain being more delicate than the others, they yield sooner; the brain grows thus oppressed by the blood; and an apoplectic fit puts an end to life.

S P E C I E S II.

Leaves of the Cherry-Bay, Lauro-Cerasus.

THE water distilled from the leaves of the lauro-cerasus is converted into a very strong poison by cohobation. When swallowed, or injected into the anus, in a small dose, convulsions either stronger or weaker arise; the animal is afflicted with a palsy, principally of the hind feet: its organs of sense remain nevertheless but little injured; for it perceives objects by hearing and sight, and moves the limbs on being pricked or pinched. In a large dose it kills in a very short time, and without convulsions; and this poison then operates so quickly, that before it reaches the stomach, the animal already experiences its deadly effects. It kills animals of cold blood still sooner than those of hot blood. The poison communicated by a wound is noxious; but then a much greater quantity is requisite: injected into the veins, it immediately destroys life: applied directly to the nerves, it affects them locally, and induces a paralysis of all the muscles, which receive
branches

branches from those nerves, but by no means brings on death: when the brain is touched by it, the animal immediately dies: the same event happens, if the poison be instilled into it's eyes, which phenomenon seems to arise from the vicinity of this organ to the brain, and not, according to the opinion of Dr. Schaub, from absorption by the lymphatic system; more especially as Fontana has observed this phenomenon in pigeons, but not in quadrupeds. When life ceases, the body appears relaxed, and the irritable power of the muscles is found to be wholly gone. Even the heart of cold-blooded animals is soon deprived of the faculty of contracting itself, when a few drops of this poison are applied to it. The doctors Fontana and Schaub have always found the blood dissolved in such bodies, the lungs inflamed, the veins distended, the dura mater and the cortical substance of the brain likewise turgid with blood, the arteries, on the contrary, empty. These phenomena are, at least for the most part, observed in such bodies *.

If I sum up what I have said of the local palsy from the poison being applied to the bare nerves; of it's virulence when applied to the eyes, and the brain; and in fine of it's speedy manner of acting; in my humble opinion, it may be concluded, that this poison, in all cases, acts locally on the nerves, destroying their power: hence palsy ensues, if the poison be applied to the bare nerves; death, if it touch the brain, or any part in it's vicinity; and

* See, on this poison, Fontana, l. l, t. ii, a p. 125 ad 155, et in *Supplemento*, a p. 306 ad 342: Murray, l. l, t. iii, p. 213: Gmelin, l. l, p. 282: Plenck, l. l, p. 110: and Schaub *de Laurò Cerasi Qualitatibus medicis et venenatis*.

hence, in fine, the quick appearance of the morbid effects. As for it's manner of acting with regard to the whole body, it seems, that, according to the different dose, it's action differs: for, if this poison be taken in a smaller dose, it incites at first the irritable parts to action; however, the poison being communicated to the vessels, irregular motions must necessarily arise, and the whole mass of blood cannot fail to become affected by the alteration in the action of the vessels induced by the poisonous stimulus; the blood, changed from it's healthy state, violently reacts on the vessels, and produces an inflammation of the lungs; the lungs, being inflamed, are unable to propel the blood, and the more as it is conveyed in greater quantity to them, on account of the inordinate action of the vessels, so that they soon become oppressed, and thus a suffocation is produced.

The cause of death from this poison, when exhibited in a smaller dose, ought therefore to be explained from the disturbed action of the sanguineous system; and especially from the impeded function of the lungs; as is proved by the empty arteries, and turgid veins. But, when taken in a large dose, it directly operates upon the vital principle, extinguishing the life of the whole body.

The antidote of the laurel water is to be looked for in the ammonia preparata, which remedy not only prevents the noxious effects occasioned by this poison, but also often performs a cure, when the symptoms have already taken place *. An emetic likewise proves useful.

* Schaub, l. l.

G E N U S II.

Narcotic Acrid Poisons.

S P E C I E S I.

Atropa Belladonna, The Deadly Nightshade.

This plant, on account of it's virulency, is properly ranked among the first of these poisons. The noxious quality resides not only in the berries, but also in the seeds, leaves, and root, though in a different degree; as the berries surpass the other parts in virulence. From a large dose of this poison arise a dryness of the mouth, a trembling of the tongue, a very distressing thirst, a difficult swallowing, fruitless efforts to vomit, and a great anxiety at the præcordia; afterwards the patient is seized with delirium, accompanied with gnashing of the teeth, and convulsions; febrile motions arise from the inordinate circulation; the face grows tumid, and of a dark red hue; the eye-lids being stretched open, the pupil is observed to be immoveable; a locked jaw is by no means an unfrequent symptom; the stomach is very insensible to stimulus; an inflammation of the stomach and œsophagus often arises, attended with the most violent pains of the abdomen; the peristaltic motion of the bowels is destroyed, they are commonly attacked with an inflammation, not unfrequently extending itself to the glands of the mesentery, and even to the lungs

lungs and liver. Relaxation of the whole body, languor of all the functions, palsy, especially of the lower extremities, convulsions, dissolution of the blood, dizziness, blindness, propensity to sleep, drowsiness, apoplexy, and death succeed. The body, which soon putrefies, generally swells, and is marked with blackish spots; the blood flows out of the nose, mouth, and ears; and the surrounding atmosphere is infected with an intolerable stench*.

All these symptoms being accurately considered, the manner of acting of this poison seems to be the following. When the deadly nightshade is swallowed, it first excites a great disorder in the animal economy, by impeding the functions of the primæ viæ, and injuring the nervous system; it afterwards enters the blood, where it produces almost the same symptoms as the water of the cherry bay, by destroying the irritability of the heart and vessels, and by dissolving the blood. But the cause of death from this poison is not always the same: the patient very often dies of an apoplexy; yet the vital principle is not unfrequently extinguished by the poisonous stimulus, and sometimes the patient is destroyed by a sphacelus of the alimentary canal.

It appears from this how far the deadly nightshade agrees with the narcotics, and how far it deviates from their manner of acting: for, though it destroys the irritability like the narcotics, it nevertheless acts on the nervous system also, and the brain directly experiences its noxious power.

* Gmelin, l. 1, p. 290 ad 308: Murray, l. 1, t. i, p. 626: and Plenck, p. 120.

An emetic, a purgative, milk, emulsions, oxymel, and vinegar, prove the best antidotes against this poison.

SPECIES II.

Cicuta Aquatica, The Water Hemlock.

THE root of the water hemlock, when swallowed, commonly brings on the following symptoms; extreme pain at the region of the stomach, anxiety, and heat, violent retching, bloody vomiting, swelling of the abdomen, hiccup, thirst, locked jaw, universal convulsions, opisthotonos, epilepsy, inflammation of the stomach and bowels, a gangrene of these parts, dizziness, delirium, distortions of the eyes, bleeding at the ears, extreme weakness, relaxation of all the powers, sleepiness, apoplexy, and death. After death, the body is swelled; the lungs are often found to be inflamed, and even mortified in certain places; the surface of the body exhibits blackish spots; and a bloody foam continually flows from the mouth*.

Analogous symptoms, and the dissections of such bodies, prove, that this poison sufficiently agrees with the former, both in the manner of acting, and cause of death: thus what I said of these, speaking of the atropa belladonna, is also true, mutatis mu-

* See Van Geuns, l. 1, p. 46: Gmelin, l. 1, p. 334: Plenck, l. 1, p. 128: Murray, l. 1, t. i, p. 397.

tandis, with respect to the water hemlock. I say, mutatis mutandis, as, notwithstanding the analogy, a remarkable difference is found between these two poisons in their manner of acting: for, in the first place, the patient not unfrequently dies of the latter by suffocation; and, secondly by it's greater acrimony, it much more violently affects the nervous system; and by it's weaker narcotic power, it exerts a less powerful action on the irritable parts.

The antidotes are the same as for the deadly night-shade.

GENUS III.

Acrid Poisons.

SPECIES I.

Aconitum Napellus, Wolf's-Bane.

THE root of this plant, surpassing the other parts in virulence, being laid upon the tongue, is found to be of a burning and very acrid taste, and the tongue is thence not unfrequently affected with a palsy: when swallowed, there arise nausea, vomiting, anxiety, looseness, most violent pains of the bowels, tumefaction of the abdomen, distortions of the eyes, spasms of the jaw, and very strong convulsions, attended with an universal rigor; which phenomena are followed by languor of all the functions, and torpor of the vital principle. Vehement commotions then succeed, the relaxation of the vital powers

ers is again observed, and the same phenomena repeatedly appear, till at length an universal debility, cold sweats, an asphyxia and fainting fit take place, which, from the total abolition of the vital powers, soon terminate in death. Although the symptoms mostly succeed one another in the above order, nevertheless a very great difference is sometimes observed: as this poison often kills immediately, and without occasioning convulsions, when taken in a large quantity *.

These symptoms clearly prove, that the nerves especially are very violently affected by this poison. It operates upon the nerves of the stomach, by which the poisonous stimulus is directly communicated to the brain. Hence convulsions, and the other symptoms of an affection of the nervous system. The nerves soon affect the other organs by sympathy, from which source the inordinate motions of the blood-vessels may be explained. This poison thus primarily attacks the nerves, and the primæ viæ alone, and the other organs only suffer secondarily: for it is not absorbed by the lymphatic system, but remains in the primæ viæ, and the disorders of the sanguineous system are only to be imputed to the nerves; therefore, those alterations of the blood, which are always observed from the narcotics, and partly also from the narcotic acrids, are never found in those killed by the acrids. From the same reason ought to be explained, why, though the

* Van Geuns, l. l, p. 47: Murray, l. l, t. iii, p. 9: Gmelin, l. l, p. 439: and Plenck, l. l, p. 168.

noxious effects already manifest themselves, and even, though the patients labour under the strongest convulsions, still the poison may very often be removed, and a stop quickly put to it's noxious effects, by the administration of an emetic.

As to the cause of death, it is evident, that a torpor of the vital principle must necessarily succeed to the violent efforts exerted by this poison; but as the organs are continually stimulated by it, they soon again collect all their force, and excite horrible convulsions, by which they in vain attempt to expel the noxious stimulus: thus the vital powers become continually more and more enfeebled; they resist however the poisonous stimulus, till at length, the organism of the body being entirely destroyed, the vital principle is extinguished amid the last struggles of resistance. Notwithstanding that this is, for the most part, the cause of death, sometimes an apoplectic fit puts an end to life; but such a cause of death only happens accidentally, and cannot be derived from the nature of the poison itself.

The antidotes are an emetic and a gentle purgative, after which milk and emulsions are to be given, in order to restore the disturbed action of the primæ viæ: antispasmodics too, and even opium, are often requisite likewise, to compose the inordinate motions of the nervous system.

SPECIES II.

Oenanthe Fistulosa, Hemlock Dropwort.]

THE root of this plant, when swallowed, brings on tremblings, convulsions, distortion of the eyes, spasm of the jaw, faintings, extreme relaxation, abolition both of the internal and external senses, *tetanus*, and death. This poison often acts so quickly and violently, that it is not unusual for the patient to fall down suddenly bereft of sense and motion. Dr. Vacher, finding in such bodies the stomach, the intestines, in a word all the viscera in a healthy state, and the patient complaining of no pain, concluded, that this poison belonged to the narcotics: but if it be considered, that the manner of acting of the narcotics is far from being so quick; that they produce very different symptoms; that an alteration of the blood is always observed from them, which never appears from this; and that there are various sensations of pain, an obtuse as well as an acute; I cannot but agree with Dr. Plenck, who has ranked it among the acrid poisons; which opinion is further confirmed by it's pungent taste*.

Therefore both the wolf's-bane and the hemlock dropwort primarily affect the nerves only;

* See Plenck, l. 1, p. 153: Gmelin, l. 1, p. 64: *Philos. Transf.* vol. 44, part i, p. 227, and vol. 6, part ii, p. 836: Vacher *Acta Helvetica*, vol. iv, p. 69: and Van der Monde, *Journal de Médecine*, t. x, 1758, mois nov. p. 430.

but the latter affects them in a quite different mode from the former: for it does not excite strong convulsions by it's acrimony, but directly destroys the energy of the nervous system in such a manner, that the vital principle can but feebly resist, and the vital powers are scarcely to be noticed. This way of acting however is not peculiar to the hemlock dropwort alone, but is common to the wolf's-bane, and the chief of the acrid poisons; for, when the wolf's-bane, or any of the others is taken in a large dose, the same phenomenon occurs, convulsions then are never to be observed, and the patient suddenly expires without them. Thus it appears, that the hemlock dropwort differs not as to it's manner of acting, but only in degree, from the others; and that the reason, why the vital powers scarcely manifest themselves, ought to be imputed solely to their being deadened by it's violence.

As this poison agrees with the former in the manner of acting, the cause of the death that ensues from it is the same likewise; with this difference only, that the hemlock dropwort does not extinguish the vital principle by repeated efforts, but, as it were, by a single shock. In fine, the antidotes to the wolf's-bane prove also efficacious against the hemlock dropwort.

Before I proceed to treat of the mineral poisons, I must take notice of a law of nature, drawn as a consequence from the six plants above-mentioned; and the more, as it also holds good with respect to all the other poisonous vegetables: viz. that all the narcotic plants always act primarily on the irritable parts

parts alone; the acrids attack only the nervous system; and the narcotic acrids affect both the nervous system, and the irritability of the muscles: yet I do not deny, but that some poisons may act particularly on this or that organ, though the rule of nature is always constant, that, according to their structure, the narcotics primarily affect the irritable parts; the acrids, the nervous system; and the narcotic acrids, both.

ORDER III.

The Mineral Poisons.

THE poisons of the mineral kingdom may be properly reduced to four kinds, viz. acids, alkalines, *oxyds*, and neutral salts. As the sharp and corrosive taste of the acids and alkalines prevents these poisons from being used, and as the subject, which claims my attention, is very extensive, passing by the others, I shall speak only of two poisons of the latter kinds, not only more violent than the rest, but also more frequently mortal; namely, the *oxyd* of arsenic, and the *hydrargyrus muriatus*:

GENUS I.

Oxyds.

SPECIES I.

The Oxyd of Arsenic.

THIS violent poison, when taken in a large dose, operates like a corrosive, directly destroying the life of the parts with which it comes into contact. When taken in a smaller quantity, it affects all the parts which it touches with a painful sensation, dryness, and heat: afterwards arise a fever, a very distressing thirst, extreme anxiety at the præcordia, nausea, and very frequent vomiting, pituitous at the commencement, in the end bilious; the stomach and bowels suffer the most grievous pain, inflammation, and corrosion; a violent discharging of black, stinking, and cadaverous matter from the anus follows; the body swells with tension; palpitation of the heart, fainting, difficult breathing, the greatest anxiety, a quick, weak, contracted, and irregular pulse, jaundice, and tremblings ensue; the extremities grow cold; cold sweats, especially of the forehead, appear; gangrene, sphacelus of the stomach and bowels, and a separation of their internal membrane at certain places, delirium, and death, succeed. On opening the body, the stomach and bowels are found corroded in such a manner, that they sometimes scarcely surpass a poppy leaf in thickness; the blood is always dissolved; livid spots appear all over the surface of the body; the nails become blue, and not unfrequently fall off, together with the hair, within the

the first day after death ; a separation of the epidermis, and putrefaction of the whole body take place ; and even some limbs drop off, either spontaneously, or upon the slightest effort, at least this phenomenon has been observed in several cases. In fine, persons are often slowly or speedily killed by arsenic externally applied ; and a woman in a short time dies, if arsenic be put into her vagina. Such a case is recorded in the transactions of the royal medical society of *Copenhagen*. A farmer, having in vain attempted to poison his wife with arsenic administered in the usual manner, being informed by an old woman, that the slightest injury of the vagina was mortal, put arsenic mixed with meal into the vagina of his wife in the morning, between seven and eight o'clock, after coition. The woman, hitherto enjoying perfect health, was unawares attacked at three o'clock in the afternoon with a continual shivering, chillness, and a burning pain of the vagina. The husband, having confessed the crime, in vain attempted to ward off the danger by an injection of milk. A vomiting, pain of the mouth of the stomach, and anxiety came on : then the woman lay, as it were, in a dying condition during some hours : afterwards vomiting, and delirium succeeded, and she died the following day at twelve o'clock in the morning. Abilgaard, professor of the veterinarian art in the academy of *Copenhagen*, demonstrated by experiments made on purpose upon two mares, that the cause of her death ought to be attributed solely to the arsenic introduced into the vagina *.

Arsenic

* See, on this poison, *Acta Hafniens.* t. iii, p. 178 : Plenck, l. 1, p. 271 : Gmelin's *Apparat. Medicam.* vol. i, p. 250 : Mead, lib.

Arsenic seems therefore to operate in a different manner, according to the different way in which it is used : for, when taken in a large dose, it extinguishes life by it's power of corroding, and destroying the organism of the parts. When swallowed in a smaller dose, as it does not instantly destroy the organism of the parts it touches, it extremely irritates the œsophagus, stomach, and bowels; which, being injured by it's violent stimulus, react with the greatest force, and at the same time, on account of the sympathy which more especially exists between the head and the stomach, communicate the poisonous stimulus to the former organ, and by it's means to all the others : hence the great number of symptoms, observed in such cases. Death indeed ensues; but the most violent pains and convulsions are it's forerunners : and these contribute to the destruction of the frame by farther breaking down the vital powers, so that death, already on the point of ensuing from the alteration of the organical structure of the primæ viæ by arsenic, is yet more accelerated by the great disorders, which arise from the re-action of the vital principle.

Therefore, in my humble opinion, arsenic, when it kills suddenly, is not absorbed, but remains in the primæ viæ, and excites all the other symptoms only by sympathy.

Most physicians, and among them the learned Dr. Mangor, are of a contrary opinion : their main arguments are the following.

lib. de Venenis, tentam. iv, p. 108 : Van Geuns, l. 1, p. 45 and 46 : and Fothergill, in *Medical Observations and Inquiries*, vol. 1, art. 37, p. 394.

1. That it is proved by many observations, that arsenic is easily absorbed, when externally applied in scald heads, ulcers, and cancer; and that, though the skin be not removed; arsenic, under the form of a plaster, sometimes produces the most violent symptoms, and even sudden death. It is beyond all doubt, that death sometimes ensues from the external application of arsenic; yet it is not proved by any argument, that the *oxyd* of arsenic itself is absorbed in such cases. For arsenic in the form of an oxyd, being externally used, acts as a caustic, destroys the surface, to which it is applied, and no absorption of it takes place,

2. That the effects of arsenic are often greater in a remote part, than in that, to which it was applied; as is proved by the falling off of the hair, giddiness, inflammation of the upper part of the *stomach*, cough, cholic, and vomiting, all which sometimes arise from arsenic externally applied. In reality, this argument would be of the greatest weight, were it not proved by the very nature of the symptoms, that they may be explained much better from the law of sympathy, than from the absorption of the arsenic; and the more, as they are observed only in delicate subjects; in others, arsenic, when outwardly applied, generally exciting no disorders.

3. That only a portion of the arsenic was found, after death, in the vagina both of the woman, and of the mare, and that thus the rest, being slowly dissolved in the vagina, must have been taken up by the lymphatic system. But when it is considered, that this diminution of the arsenic may be well explained both from the

flowing of the humours, always fecerned by the vital power to obtund an acrid stimulus, and from many other accidental causes, without having recourse to the absorption of such an acrid substance, which beside is refuted by the accompanying phenomena; if I add, that milk was injected into the vagina of the woman; it will appear to every one, that no argument can be drawn thence against my opinion.

4. That the lungs were found black, livid, and the blood dissolved in the body both of the woman and the mare. But if arsenic be swallowed, the gangrene of the lungs is so seldom observed, that the most accurate authors Plenck and Gmelin have not taken notice of this symptom, which, therefore, seems to be better derived from the sympathy existing between the thorax, and the genitals: and as to the dissolution of the blood in the veins, not the least argument can be drawn from this symptom, as it is likewise observed in those slain by an electric shock; yet nobody will suppose, that the dissolution of the blood is in this case an effect of the absorption of the electricity.

These are the arguments, with which they defend their opinion; but they are far from sufficient to demonstrate the absorption of the arsenic. On the other side of the question, I have three observations at hand, which, in my humble opinion, evidently prove, that no absorption takes place.

The first is taken from the elective power of the orifices of the lymphatic vessels: for as all
acrids,

acrids, and even the *ferrum vitriolatum*, though mixed with a great quantity of water, are rejected by the absorbent vessels *: is it to be believed, that the lymphatics, which do not absorb the *ferrum vitriolatum*, on account of it's stimulus, would take up arsenic, greatly surpassing the *ferrum vitriolatum* in acrimony?

Secondly, the medicines, by which the noxious effects of this poison may be stopped, no less prove my opinion. It is well known, that *hepar sulphuris calcareum* affords the best antidote for persons poisoned by the oxyd of arsenic, and that they are cured by taking a solution of this medicine in large quantity; if it be but made use of previous to the destruction of the organical composition of the stomach and bowels. As it is evident, that the *hepar sulphuris calcareum* cannot put a stop to the dreadful effects of this poison, but by forming a new and innoxious composition by it's union with the oxyd of arsenic contained in the *primæ viæ*; it follows of course, that no absorption of it takes place.

For the third, which is of the greatest importance, I am obliged to Dr. Mangor himself, who records, that one of the mares, upon which Dr. Abilgaard made his experiments, was cured by injections alone, after her vagina had been filled with arsenic during at least twelve hours, and the usual effects of the poison had already partly appeared. Which observation manifestly proves, that arsenic is not absorbed, but that, being taken, it acts

* See my Dissertation *De Causa Absorptionis*, cap. ii, § 10.

topically in the primæ viæ, and affects the other organs only by sympathy: for the effects of the poison had already appeared, and yet a topical remedy was sufficient to cure; therefore I do not doubt, but, that the arsenic itself is never absorbed.

This however is true only, with respect to the oxyd of arsenic, a violent corrosive, but not with regard to the other less acrid preparations of the mineral. For if arsenic be given in a very small dose, especially when used in a solution with alkali, &c., it's deleterious power is determined in a quite different manner: it then no more excites an inflammation, or corrosion, but diminishes and deadens the functions of the body, by destroying it's organical structure by slow degrees; therefore marks of an inflammation of the stomach and bowels are never found in the bodies of patients killed by arsenic administered in such a way; on the contrary, in such cases, arsenic, having lost it's corrosive power, is carried with the chyle to the intestines, where the disguised poison, having imposed upon the elective power of the orifices of the lymphatics, is absorbed together with the chyle by them; and the absorbent vessels convey this metallic substance, unfit for assimilation, as it were crude or unassimilated to the sanguineous system. However, as this system can as little assimilate the arsenic as the lymphatics, the mass of blood is infected by the poison: but as soon as the poison is communicated by means of the vessels to all the parts of the body, the noxious effects of the arsenic show themselves, the vital power of the organs becomes diminished, and all the functions gradually languish; these

these symptoms daily increase, because the solids are continually more and more weakened and depraved by the blood imbued with the poisonous quality of arsenic: pains shifting through the whole body, a choking thirst, a consumption, and a hectic fever arise; and at length the organic structure of the body being wholly destroyed, death closes the scene.

GENUS II.

Neutral Salts.

SPECIES I.

Hydrargyrus Muriatus.

THIS preparation of mercury is to be ranked among the strongest poisons of the mineral kingdom. When taken it occasions a dryness of the mouth and tongue, an insatiable thirst, a violent retching and obstinate vomiting, a burning and rending pain of the stomach, griping of the bowels, a bloody flux, an inflammation and gangrene of the stomach, and intestines, convulsions, faintings, the utmost relaxation of the powers, hoarseness, cold sweats, and death succeed. The body soon putrefies, and corrosions of the stomach and intestines are almost always observed from this poison.

As it agrees with arsenic in it's phenomena, and differs from it only in it's degree, the manner of
acting

acting and cause of death are likewise found to be analogous: for if it be swallowed in a large dose, like arsenic it immediately destroys the vital principle, and kills without occasioning convulsions: when taken in a smaller quantity, it destroys life partly by stimulating the solids, and farther reducing their powers in consequence of producing irregular motions; and partly by it's corrosive, and destructive quality.

But physicians do not agree with respect to the manner in which this poison operates when dissolved in water or brandy, and taken according to the prescription of the celebrated van Swieten. Van Swieten himself records many instances of patients cured of various diseases by it's use*: the experiments made with this medicine upon english soldiers, by order of the illustrious Pringle, favour this opinion†: the same is asserted by the celebrated Stoll, who nevertheless does not deny, but that it had sometimes injured: in fine, this assertion is supported by the Drs. van der Eem, and van Leeuwen, who enumerate a long catalogue of diseases cured by this preparation of quicksilver‡. On the other hand, the chevalier Brambilla writes, that the hydrargyrus muriatus had not only failed of answering the purpose, but that spitting of blood, consumption, and palsies, have not unfrequently arisen from it's use. He thinks therefore, that van

* *Commentaria in Aphorismis Boerhaavii*, t. v, § 1477, p. 549.

† *Medical Observat. and Inquir.* vol. i, art. 28, and vol. ii, art. 3 and 4.

‡ *De Ufu Venenarum in Medicina Aet. servand. Civib.* t. xi, p. 668, and the following,

Swieten and Pringle were deceived by those to whom the cure of the patients was committed*; with which opinion the observations of Plenck and Quarin agree; the former of whom observes, that it's use produces a consumption, a spitting of blood, and a cough; and is of opinion, that physicians ought totally to refrain from the use of this medicine†: the latter speaks thus: "I have
 " known some to be benefitted by the sublimite;
 " yet it has injured most patients, and I have
 " seen, that a contraction of the limbs, incurable
 " diseases of the nerves, hemoptoes, and deadly
 " consumptions, have arisen from its administra-
 " tion. Perhaps it may sometimes be of utility
 " in strong men, or in men of a lax torpid habit,
 " but it ought unquestionably to be condemned in
 " very irritable patients, or those of weak lungs‡." Dr. Girtanner is of the same opinion, asserting, that the symptoms of the venereal disease indeed entirely disappear within a few days, but that the viper lurks under the grass, and the disease afterwards returns with greater force; to prove which he has collected a great number of observations from different physicians, and in fine he relates from his own experience, that all the patients, who had made use of this medicine, died of a consumption within a few years§. Lastly, the celebrated Fourcroy seems to recede but a little from this opinion; for he says,

* *Chirurgische praktische Abhandlung von der Phlegmone, und ihren ausgangen*, ii Theil, p. 363.

† L. 1, p. 263.

‡ *Animadv. pract. in diversos Morbos*, cap. xvi, p. 318.

§ *Abhandlung uber die venerische Krankheit*, i Theil, lib. iv, capitel 16, p. 360.

“ it is requisite, that the lungs be in a strong state,
 “ when this remedy is administered, as great pru-
 “ dence is requisite. It is a dangerous affair, that
 “ the preparations of quicksilver, especially it’s
 “ salts, should be in the hands of so many persons, as
 “ I have often observed very pernicious effects from
 “ their inconsiderate use ; and I think, that precau-
 “ tions ought to be taken in this business by the
 “ public authority *.” In this difference of opinions,
 comparing all together, it seems to me that the fol-
 lowing consequences may be drawn.

1. Though it appears, from the observations
 above mentioned, that the hydrargyrus muriatus
 can by no means be indiscriminately administered,
 and ought never to be given without precaution,
 yet I cannot thence conclude, with Dr. Plenck, that
 this remedy never should be inwardly taken : and the
 less as the Drs. *van der Eem*, and *van Leeuwen* have
 proved by a great number of observations, that this
 remedy has affected a cure in many diseases, in which
 all others were tried in vain ; even in the venereal
 disease, though, in general, this complaint may be
 radically cured by other preparations of mercury
 more mild in their manner of operating, and of course
 the hydrargyrus muriatus ought never to be em-
 ployed generally for the cure of the lues venerea ;
 yet we sometimes meet with cases, especially if the
 disorder have been of long standing, which resist
 the exhibition of all other preparations, and to
 effect a radical cure the practitioner must have re-
 course to the hydrargyrus muriatus.

* L. I, t. iii, chap. xv, p, 136 and 137.

2. Though

2. Though the hydrargyrus muriatus, when properly administered, affords a powerful medicine in many obstinate diseases, nevertheless some rules and cautions are to be observed in using it. This medicine ought never to be prescribed to those, who have tender lungs, or are disposed to consumption; it is also unfit for such as have the first passages weak, or very irritable: in like manner it should not be given to men of a tender and delicate fibre; it is generally hurtful to women with child, or lying-in: even to men, at least in the beginning, it ought to be given, in a small dose; for it operates very violently on some persons. I agree therefore with the immortal Boerhaave, “ that the hydrargyrus has wonderful effects in many incurable diseases, when cautiously given by a prudent physician, but let those refrain, who are unacquainted with the proper mode of administering it *.”

3. As the bark, when taken with the solution of van Swieten, prevents the noxious effects sometimes observed from its use; while it does not in the least deprive it of its antivenereal power, as is proved by the conjunction of the hydrargyrus with the bark generally recommended when any body labouring under the venereal disease is farther attacked with an intermitting fever; the bark may be joined with the greatest advantage to this solution in many cases; and the more, as it is demonstrated by the observations of modern physicians, that both the mercurius dulcis, and the hydrargyrus muriatus, when united with the bark, may be exhibited in the lues venerea,

* *Elem. Chym. t. ii, processus* 198, p. 488.

without any danger even to patients, whose constitutions do not otherwise admit of their use.

4. As it is at present beyond all doubt, that both the hydrargyrus muriatus and the mercurius dulcis are decomposed by all vegetable astringents, and that gallas hydrargyri is produced from the union of the acid of galls, to which plants owe their astringent power, with the quicksilver, it follows, that the oak apples, and the bark, containing the greatest quantity of this acid, must likewise be the best antidotes against this poison. As, moreover, mercurials, when taken together with the bark, retain their antivenereal power, it is evident too, that, at least in the cure of the venereal disease, the gallas hydrargyri affords a remedy free from all danger, and inferior in efficacy to no other preparation of mercury.

APPENDIX TO THE POISONS.

The Poison called Tucumas.

OF all the poisons, the nature of which is hitherto concealed, I shall only mention this famous american poison; because the illustrious Fontana has made many experiments upon it, according to which it appears to have the following properties. It does not injure either by the smell or taste, in both which it bears a strong resemblance to licorice: it possesses neither the properties of an acid, nor of an alkali: when swallowed, it in reality proves
noxious,

noxious, but then a very large dose is requisite to occasion death: applied to the skin it does no injury, whereas communicated to the body by the slightest wound, it is certain death. It nevertheless acts less speedily than the poison of the viper, and the excision or burning of the wounded part affords the best antidote: it does not affect every kind of animal with the same violence, as serpents, vipers, worms, and insects, are not liable to it's noxious effects; though other animals, such as frogs for instance, die in consequence of them. Applied to the bare nerves, the poison is not communicated to the body; but when injected into the blood vessels it instantaneously kills, and without causing convulsions. In animals killed by this poison the lungs are found to be inflamed; the arteries contain no blood, the veins, on the contrary, are turgid; the blood is of a black hue, and does not coagulate; the muscles are universally flaccid, and more pale than usual.

The common symptoms, which ensue from the introduction of the poison by means of a wound, are convulsions, a sudden relaxation of all the powers, and an abolition of sense and motion: afterwards the animal is attacked with an universal palsy, the respiration is impeded, and lethargy, followed by death, ensues: but if the animal do not die, it is restored to it's former health within a few hours. It is farther remarkable, that this poison, though in other respects extremely injurious to the irritability, according to the observations of Dr. Fontana, does not diminish the power either of the heart or of the bowels*.

* Fontana, l. 1, t. ii, a p. 83 ad 124, *Philos. Transf.* vol. 44, p. 408, and vol. 47, p. 75, and van Geuns, § 45, p. 55 and 56.

With respect to the manner of operating of this poison, it seems to be taken up by the absorbent vessels, and to be conveyed by them to the sanguineous system, but as soon as it enters this system, it acts on the vessels, occasions irregular motions, and destroys the irritability both of these and of the other muscular parts by its violent stimulus. Besides, the blood tainted with a poisonous quality produces an inflammation of the lungs, and puts a stop to their function.

As now no part of the human body can be injured by a morbid power, without the vital principle attempting to repel the stimulus, the nervous system and the other organs become affected by sympathy; therefore though the nerves do not primarily suffer from this poison, they are nevertheless always secondarily affected by it.

Let it not be argued against this explanation, that the absorption of this poison is not probable, as the skin is not destitute of lymphatic vessels, and a much greater quantity of this poison is requisite when swallowed. These objections do not refute my opinion; for, beside that, as we saw before, the trunks of the lymphatics absorb stimulating substances much better after their radiated extremities are destroyed by a wound or ulcer, it is highly probable, that the orifices of the absorbent vessels enjoy a different structure, according to the different offices to which they are destined by nature; as the celebrated Mascagni has proved, that the structure of the lymphatic system varies, so as to be adapted to the different matters to be taken up: therefore,
though

though the power of assimilating the contained humours is common to the whole absorbent system, still it is not equally vigorous in all the parts of this system: and even this poison must undergo a great change in the lymphatics, when communicated by a wound; because otherwise, in the same manner as when it is directly mixed with the blood by an injection into the vessels, the animal would be instantaneously bereft of life.

Thus, in my humble opinion, this poison primarily affects only the irritable parts, and the lungs; and the other organs suffer by sympathy alone: so that the cause of the death brought on by it is to be derived from the inordinate action of the sanguiferous system, and especially from the impeded function of the lungs.

C L A S S VII.

DEATH FROM UNIVERSAL DISEASES.

*This Class comprehends the idiopathic Fevers and febrile Diseases.
It is thus naturally divided into two Orders.*

O R D E R I.

Fevers.

AS fevers are the most frequent of all the disorders to which human nature is liable, particular attention ought to be paid to them in a work of this kind. It is somewhat difficult to give a nominal definition of fever; for though fevers are generally attended with some degree of chillness, increase of heat, and frequency of pulse, and the vigour with which the animal functions are performed is diminished; yet it is well known, that fevers do occur, in which the stated phenomena are not met with, and we are not acquainted with a single symptom, that invariably takes place in every fever; fortunately however, though we cannot define fever, practitioners are seldom at a loss to know whether it be present or not.

The remote causes of fever are numerous, and there are but few noxious powers, that under some circumstances may not bring on fever: they all however operate only in two ways; namely, they either excite febrile motions by weakening the system by their sedative quality; or they produce
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the same effect by stimulating the body too much. In both cases the irritability of the body is increased in consequence of the real or spurious irritation of the vital principle, and fever makes it's appearance. The proximate cause of fever consists thus in increased irritability of the system, and fever may be defined a salutiferous effort of the *natura mediatric*, to get rid of the noxious stimulus; for in the beginning of the paroxysm of fever, there is always a kind of lassitude, chilliness, and debility, in consequence of a noxious stimulus making an attack upon the general system; but the vital principle being roused, in order to resist the stimulus applied, the colour of the skin returns, and an increase of heat is diffused over the whole body; till at last the enemy being repelled, or at least checked in it's action, a resolution or diminution of the fever takes place with relief of all the symptoms. This is especially illustrated by considering the different stages of an intermitting fever during it's paroxysm. In the first stage the languor, paleness of the face, and extremities, the spasmodic contraction of the vessels on the surface of the body, rigor, small irregular pulse, anxiety, oppression at the precordia, and diminution of all the secretions, are so many tokens of a noxious stimulus exerting itself to destroy life: whereas in the second stage there are two powers acting; one, that of the noxious stimulus, having a tendency to destroy the animal economy; the other, that of the vital principle endeavouring to correct and to remove the morbid power by increased action. Hence the high colour of the urine, the strong and hard pulse, the pain in the back, head, and extremities, the increase of heat, and the

return of the colour of the skin, with tension and redness; which terminate in the third stage or crisis of the disorder, as soon as the enemy has been conquered by the *natura medicalrix*.

According to the different degree of violence, with which the morbid stimulus operates, and the different re-action and strength of the affected body, the fever makes it's appearance under a different form. This has given rise to the division of fevers into intermittent, remittent, and continued, of which many varieties are recorded by writers on the subject. All these however may be properly reduced to the five following kinds; the nervous, the intermittent, the gastric, the putrid, and the inflammatory fever; which, on account of their frequently occurring, deserve particularly to be inquired into.

The intermitting fever.—We have already described the symptoms of the ague, which is divided, according to the duration of the interval between the paroxysms, into quotidian, tertian, and quartan, which may be either single or double. The intermitting fever is never dangerous in itself, though it may destroy life, when it's manner of acting upon the human body is changed by any accidental circumstance: for it is well known, that intermittents are modified by the prevailing epidemic, the season of the year, and the constitution of the patient. The danger, duration, and treatment of the disease depend especially on the character of the prevailing epidemic. Of this we have a striking instance in the epidemic fevers

fevers attended with a comatose affection of the brain, which terminate in a mortal apoplectic fit, unless a large dose of opium, given in, or still better a short time before the paroxysm, takes away this tendency to apoplexy. The seasons likewise greatly influence the nature of the ague; as, according to the different time of the year, it partakes of an inflammatory, bilious, or putrid diathesis. Hence Sydenham distinguishes agues into vernal and autumnal. In fine, in the prognosis of intermitting fevers, attention should be paid to the constitution of the patient: for even the vernal intermittents, though often salutary by their purifying the general system, may destroy life in old people, and in those of a bad habit: for life languishes in such subjects, and therefore the organs cannot duly counteract the morbid stimulus.

With respect to the cure of intermittents, this is to be performed by the exhibition of an emetic given a short time before the accession of the paroxysm; by clearing the primæ viæ, in cases where fordes exist, by rhubarb and calomel, by which the fordes are at once effectually expelled from the body. This mode of evacuating the alimentary canal is far preferable to the protracted use of saline remedies, in order, as it was said, to prepare the system for the use of tonics; since it is at present clearly proved, that the morbid affections of the abdominal viscera, dropsies, and other disorders, which sometimes succeed to intermittents, do not arise in consequence of the bark being given too early, but originate from the long continuance of the ague, from the neglect of bark in the beginning, or from it's not
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being used in a sufficient dose. But above all, the bark must be given during the intermission in a sufficient quantity for the prevention of the return of the paroxysm: for, in fever, of all tonic remedies the bark is justly deemed the most effectual. The continuance of the apyrexia will point out the intervals, in which it ought to be taken; the shorter the time of intermission between the paroxysms, so much the larger must be the dose, and the more frequently the bark should be administered, in order to prevent the fever from changing into a remittent or continued one. There are three kinds of bark, the common, the red, and the yellow; the latter two are far the more efficacious, and often bring about a cure, where the former has failed. In all cases, if possible, the bark is to be given in substance, as being thus the most powerful; but often the patient cannot bear the exhibition of the bark itself, in which case recourse is to be had to its decoction, hot or cold infusion, extract, and tincture. If the irritable stomach of the patient cannot bear the bark in any form, and if no medicine be capable of removing this irritability, which however but very seldom will be the case, then the bark is to be introduced into the system by the means of glysters; though this mode is by no means so efficacious, as that of taking the bark by the mouth. The bark is best given by itself; it is however useful, to add some ginger and licorice to it, in order to give it a more agreeable taste. In case the irritable stomach should not be capable of bearing it, the *potio antemetica* of Riverius, that is the sal absynthii saturated with lemon juice, or the vegetable acids alone, should be given along with it. When the intestines

The Salts Saliva in stool often do

do not bear the bark well, some tincture of cinnamon, and catechu, will generally stop the looseness brought on by the cinchona: but supposing these remedies should prove ineffectual, the cinchona is to be mixed with gum arabic, or with saleb, and opium is to be combined with it. When the bark renders the patient costive it is much better to keep the body open by gentle laxative glysters, than to add rhubarb to it.

It has been pretty generally the fashion, previous to the exhibition of the cinchona, to tease the patient a good deal with the various preparations of antimony. Some physicians have carried this idea so far, as to give emetic tartar along with the bark, under the mistaken notion, that antimonials prepare the body for the use of the cinchona, and promote it's operation when combined with it. That a vomit, exhibited a short time before the accession of the cold fit, even though the state of the stomach do not indicate it, frequently removes the fever by throwing the system into other motions, and rendering the body more susceptible of the salutiferous operation of the cinchona, so that the bark, before ineffectual, now is capable of conquering the disease; that it is still more advantageous to give the emetics not in their full dose at once, but in small doses at short intervals, so as to secure their vomiting effect, are facts founded on experience; but the preparative exhibition of the antimonials, and their combination with the bark, do nothing but weaken the body, and impede, or at least retard the salutary operation of the cinchona; and I have

never seen any other than bad effects from their exhibition.

Although the bark, when given in large doses, and for a sufficient length of time; for it should be continued until the patient has missed several paroxysms, and afterwards the quantity be diminished by slow degrees; will but seldom fail to remove the fever, yet it is to be acknowledged, that now and then intermittents do not yield to it's exhibition. In these cases I have sometimes seen the common fever cured by the exhibition of a decoction of the *cortex salicis albæ* and gentian, by the flores arnicæ given either in substance or in infusion, by camomile flowers and alum, and by combining the bark with the serpentaria virginiana, or with the preparations of steel; but arsenic is more certain than any of these in it's operation, and soon puts a stop even to the most obstinate intermittents. It is however to be observed, that what I have stated on the cure of intermittents holds good only with respect to the simple idiopathic ones; for if the intermittent should be complicated with other diseases, then remedies suited to the nature of the disease, with which the ague is combined, are to be used along with the cinchona, by which mode both diseases are commonly removed. There is a kind of intermittent which *frequently* observes the period of a quartan, and which originates from a morbid condition of the abdominal viscera, especially of the liver. In these cases the intermittent is but a symptom of the diseased abdominal viscera; and as these febrile motions are very useful in assisting nature to overcome the disease, it would be madness to check nature in it's salutiferous effort by exhibiting bark; unless

unless the *natura mediatric* possesses sufficient power to bring about the desired effect; the remedies which, under such circumstances, cure the fever, and remove the morbid condition of the viscera, are aperients. In cases where the patient is of a cold phlegmatic temperament, of an advanced age, or of a torpid relaxed habit, aperients of a hot stimulating kind should be given, such as the extractum hellebori nigri, chelidoniæ majoris, cardui benedictæ, gentianæ, the gummi ammoniacum, galbanum, sagapenum, myrrha, asafœtida, guaiacum; squills; the root of wake robin; sal ammoniac; sulphu rauratum antimonii 3ties præcip.; kermes mineralis; and the tartarus emeticus: whereas in young persons of a sanguine or choleric temperament, or of an irritable delicate constitution, these remedies would do a great deal of harm, and medicines of a less stimulating nature, commonly called the cooling aperients, accomplish the cure; among which the cremor tart., the tartar. tartarifat., the terr. fol. tart., the extr. taraxaci, graminis, marrubii albi, the radices taraxaci, graminis, bardanæ, saponariæ, & quinque aper., soap and rhubarb, are the chief. Mercury may be given along with the aperients of both kinds, with considerable benefit to the patient, especially when the liver is the organ affected. The use of the visceral glysters, according to the mode of the celebrated Dr. Kempff, likewise extremely promotes the cure; especially in conjunction with the exhibition of aperients by the mouth.

During the paroxysm, opiates are to be given in the commencement of the hot fit, as it is at present clearly proved, that these medicines shorten it's duration

ration, and promote the resolution of the disease. Lemonade, or nitre and sugar, given in cold water, may be likewise exhibited. In the first stage nothing can be done, but to render the fit milder by the tepid bath, and by exhibiting a warm infusion of elder or chamomile flowers, given in a moderate quantity. The diet of the patient, during the intermission, ought to be of the nourishing kind, and a moderate quantity of wine is to be recommended, especially when tokens of a general weakness appear.

The gastric fever is known by a foul tongue, a bitter taste in the mouth, especially in the morning, a fallow countenance, watchfulness and anxiety, languor and debility, vertigo, a tremulous motion of the lower lip, pain in the head, shoulders, and the back, a quick, small, unequal, generally soft, but sometimes hard pulse, great thirst, a loss of appetite, a sense of weight, fulness, and heat in the precordia: sometimes pain in the side, tension of the abdomen, retching, and vomiting itself. There is scarcely any disease, which sooner yields to the power of physic, than the bilious or gastric fever, when properly treated in it's commencement. The physician ought immediately to have recourse to means by which, in a short time, the primæ viæ may be effectually cleared; which are vomits, purgatives of rhubarb, calomel, cremor. tart., and magnes.: the patients should drink plentifully of lemonade, made with lemon juice or concentrated acid of tartar: and a decoction of the grass root, or of the dandelion, combined with their extracts, and some of the cooling neutral salts, for instance, the tartarus tartarifatus, the sal. polychr. seign., or the terr. foliat.

foliat. tart., given in the mean time, will considerably assist the operation of the vomits and purgatives. Sometimes the gastric fever, instead of being bilious, partakes of the pituitous character. In these cases the tongue is covered with a thick white crust; the taste, instead of being bitter, is like that of rotten eggs; the countenance of the patient is pale, and the habit relaxed and torpid. If under such circumstances the practitioner should immediately proceed to the use of emetics and purgatives, these would be incapable of answering the purpose, for the fordes adhere so firmly to the alimentary canal, that they require the use of resolvents for a few days, in order to prepare them to be expelled from the body by vomiting and purging. For this purpose nothing proves more efficacious, than two or three grains of the emetic tartar, given in a mixture along with the neutral salts. Purgatives ought here to be more of the stimulating kind, such as senna and jalap; and aperient glysters may be exhibited at the same time with advantage. The primæ viæ being cleansed by these means, the system is to be strengthened, in order to prevent a relapse of the disease by bitters, the cinchona, the preparations of steel, the use of wine, and a nourishing diet.

But though I grant, that, in true bilious fevers, the first indication is to clear the primæ viæ, and that tonics, previous to the use of evacuants, often do a great deal of harm; yet I am very much disposed to doubt, whether the physician, in all cases where fordes of the primæ viæ appear, is justified in exhibiting resolvents and evacuants. For in every fever, where the patient has been teased
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with a long continued use of such remedies, the consequence is, that the organs of digestion are considerably weakened: hence the primæ viæ are filled with fordes, as the weak organs of digestion are incapable of performing their function: every day a morbid matter is generated afresh; and the longer the practitioner goes on with the use of resolvents, in the larger quantity are the fordes accumulated in the primæ viæ, the tongue becomes daily more and more foul, and the appetite is lost; because the tone of the alimentary canal is continually enfeebled by the operation of such remedies. Besides, a continual stimulus on the primæ viæ being kept up by them, according to the law of nature, that the more any organ is incited to action, the more humours are solicited towards it, the excretions of the primæ viæ are promoted; whereas the other secretions, especially the insensible perspiration, are materially diminished. It would be madness under such circumstances, to persevere in using resolvents and aperients: it is true, that a morbid matter is discharged by them, but the evacuation of a bilious or pituitous matter after the exhibition of emetics and purgatives by no means always proves, that the morbid matter existed previous to their use, and the physician has been justified in giving them, for it is well known, that the most healthy man will vomit bad bile after having taken an emetic three or four times, and if persons in health should take neutral salts for several days, the consequence would be an oppression on the precordia, loss of appetite, and a foul tongue. As thus in these cases the fordes of the primæ viæ originate from the weakened tone of the primæ viæ, and are frequently
nothing

nothing but the effects of the too long protracted use of resolvents and evacuants, the natural inference is, that such remedies are by no means calculated to remove the disease, but that the medicines indicated here are tonics ; such as astringents, bitters, bark, steel, alum, snake-root, and wine, by the use of which the foulness of the tongue, the depraved taste in the mouth, the sense and weight of fulness in the stomach, gradually disappear, the appetite returns, and the patient's health is perfectly restored.

It appears therefore, that when fordes of the primæ viæ appear, the practitioner should by no means have recourse in all cases to evacuants and resolvents, but ought carefully to distinguish, whether the fordes of the primæ viæ be the cause of the fever ; or, on the contrary, owing to it's morbid action on the system, or even the effects of the too long use of resolvents and evacuants. In the former case aperients and evacuants should be exhibited ; whereas in the latter, to clear the primæ viæ, nothing proves so powerful as a free use of tonics and wine.

If the gastric fever should prove mortal, which, if the disease have been properly treated in it's commencement, will seldom be the case, life is destroyed in three ways.

1, The bad bile produces dreadful disorders in the animal economy, and a continual vomiting and diarrhœa take place, by which the vital powers are materially weakened, and, if a stop be not quickly put to it's action, the patient is carried off by the violence of it.

2, The acrid bile may excite spurious inflammations of the viscera, soon running into gangrene; in which case, the patient dies from a mortification of the bowels.

3, The bilious matter is sometimes transferred by metastasis to the vital organs, especially to the brain and lungs, and produces an apoplexy or peripneumony, which frequently terminates fatally.

The nervous fever has been named the slow fever, as in it's commencement it seems to be a mere debility of the nervous system, and the disease therefore may be protracted during a longer time, than either the gastric, putrid, or inflammatory fever usually continues. The symptoms of debility are the most prevalent: there are a great lassitude and weariness over the whole body; a pale and desponding countenance; sighing; amazing anxiety and dejection of spirits, the patient sometimes even fears to shut his eyes through dread of dying; loss of appetite; watchfulness; difficulty of respiration; alternate chilliness, with flushing, so that the cheeks often appear florid, while the nose and ears are cold, and the forehead in a clammy sweat; giddiness, and pain in the head; a great sensibility to light and noise; the tongue is moist with a white mucus on it, and sometimes a brown or yellowish list running along the middle; there is an oppression on the precordia, with nausea, and vomiting of an insipid pituitous matter; the pulse is frequent, quick, weak, irregular, and often intermittent, with little heat or thirst; and the urine is pale and limpid. All the complaints generally increase towards night.

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In a few days after, the pain and heaviness in the head become very distressing and severe; there is a coldness of the extremities, a tinnitus aurium, slight delirium without fury; the voice of the patient becomes hoarse, and sometimes the power of speech is lost altogether; the tongue grows dry, red, and chapped; the patient, from being very irritable, becomes stupid, and insensible to external objects; the celebrated Dr. Tissot records instances, where all the five senses have been lost, and yet the patient recovered; coma, tremor of the tongue, with sub-sultus tendinum, prostration of strength, fainting on sitting in an erect posture, clammy sweats, involuntary discharges by urine and stool, and convulsions come on, and death closes the scene.

The prognosis of the disease depends on the symptoms. The favourable signs are a moist tongue, early disposition to salivation, a gentle moisture on the skin, scabby eruptions about the nose and mouth, tumours of the parotid glands, a moderate diarrhœa, deafness, and a more regular pulse. The dangerous symptoms are extreme debility, tremulous motions of the tongue, lips, and hands; sub-sultus tendinum; coma; laborious respiration; a low, quick, fluttering, pulse; miliary eruptions; partial sweating about the breast and forehead, with cold extremities, when the nails, the lips, and the tip of the nose become pale or livid. If confluent aphthæ of a brown or black colour appear, with impeded deglutition; if profuse clammy sweats break forth, and cover the whole surface; if the stools be loose, watery, fetid, and frequent; if the fœces, urine, and tears go off involuntarily; if a hiccup
come

come on; if the patient become quite insensible, and cannot be raised by powerful external stimuli; and if general convulsions should appear; a fatal termination of the disease is to be expected.

This disease has no regular crisis. About the seventh or eighth day after the patient has been confined to his bed the symptoms increase; if it prove fatal, the patient generally dies on or before the fourteenth day; life is usually preserved after the twentieth day of the disease.

In the cure of this disorder all strong evacuations should carefully be avoided, and the *vis vitæ* is to be supported by tonics and stimulants during the whole course of the disease. In the beginning of this fever it is advisable to give a gentle emetic in order to clear the stomach, procure stools, open the pores of the skin, and stimulate the nervous system by the shock it gives to the whole body. Purgatives are of no use at all. To keep the body soluble, a few grains of rhubarb and magnes., or sal. polychr., are sufficient; or, it may be done by throwing up emollient clysters from time to time. A gentle moisture on the skin may be excited by the spiritus Mindereri, Dover's powder, or camphor dissolved in vinegar and given in a small dose; but the chief cure is to be performed by tonics, and stimulants. Wine is one of the chief cordials, and perhaps the most powerful in this disease: it ought to be a good strong wine such as port wine, or madeira; and the patient may usually be indulged with a considerable quantity; for it allays the delirium, procures a sound sleep, renders the pulse slower and fuller, and supports the *vis vitæ* under the profuse sweats, the
colliquative

impressions, mustard whey may be administered, and particularly asafœtida, and the flowers of the leopard's bane given in a decoction or infusion from \mathfrak{z} ss to \mathfrak{z} ss to ii℔ of water. This last remedy the celebrated Dr. Stoll has frequently given with the best success, and I have seen some patients snatched from the jaws of death by it's use; but it is best to combine it with chamomile flowers, in order to prevent it's violent action on the stomach. The subsultus tendinum, tremulous motions of the extremities, and delirium, with a small, quick, and hard pulse, are best relieved by musk, given from gr. x to \mathfrak{z} i, every half hour, hour, or two, or three, hours; and small doses of opiates may be usefully joined with it, for by these means a quiet sleep is often procured to the patient. The sighing, the dejection, and terrour of mind, are best removed by sp. c. c., ammonia, castor, and valerian. In cases of restlessness, with or without delirium, the fomenting of the extremities with vinegar and water, and the laud. liq. Syd. given from ten to twenty drops, will often procure both sleep and perspiration. In colliquative symptomatic diarrhœa small doses of rhubarb with ipecacuanha, or with the extract. cascarillæ, the terra catechu, Dover's powder, the tinct. thebaica in small doses, alum whey, the bark, the radix arnicæ, salep, gum arabic, the decoct. alb. Syd., fomentations of wine applied to the abdomen, and glysters of bark, chamomile, and opium, are the most efficacious means to put a stop to the loose watery stools. The colliquative sweats are best moderated by the plentiful use of wine, by a vinous infusion of sage by small doses of opiates, by the bark, and by a mixture of equal parts of the spiritus vitrioli and alcohol.

alkohol, given from twelve to thirty drops every one or two hours.

As soon as the violence of the disease has been abated by the above remedies, and the fever begins to be of the remittent kind, recourse should be had to the bark. As the patient's stomach does not usually bear it in substance, it's infusion in wine is to be given, to which the tincture, and snake root may be usefully added; and it is to be observed, that, in the cure of this disease, next to wine, the cinchona is the chief medicine; for it supports the *vis vitæ*, prevents metastasis, removes the aphæ, and cures the clammy sweats. The diet of the patient, during and after the disease, ought to be of the nourishing kind: chicken-broth, beef-tea, veal, fowls, fago, salep, chocolate, jellies, beef and mutton broth, in conjunction with country air, moderate exercise, and the use of milk. It is however to be observed, that, as all food is only nutritious as far as it is properly digested, and the organs of digestion are but weak in this disease, the food and drink should be taken often, in small quantities at a time, because the weak stomach cannot bear a great meal at once.

If the nervous fever prove fatal, it may destroy life in six different ways:

1. The vital powers become daily more and more weakened, and fainting, and cold sweats appear on the slightest motions; the vigour of the solids is diminished every day, till the spark of life at length

gives way to the morbid stimulus, and the patient gently expires.

2. The patient is not unfrequently carried off by an apoplectic fit, on account of a fatal translation of the disease to the head.

3. Sometimes suffocation takes place, a translation happening to the lungs.

4. The morbid stimulus chiefly attacking the primæ viæ produces a colliquative diarrhœa, by which the vital powers being entirely broken, the patient is destroyed. In this case life is extinguished by the depraved action of one or two organs requisite to the support of the vital principle.

5. Profuse clammy sweats often cover the whole body, which having deprived the system of all its remaining energy, death is ushered in.

6. The solids, collecting for the last time all their powers, excite general convulsions, by which the thread of life is snapped asunder.

The putrid fever may be defined to be a languor of the whole habit, but more especially of the vascular system; for on account of the great debility of this system, evident signs of a tendency of the blood to dissolution take place. The symptoms are intense burning heat, alternating with chilliness; extreme and sudden prostration of strength, attended with a great despondency of mind; loss of appetite; oppression at the præcordia; nausea, and vomiting.

vomiting; a pulse sometimes in the beginning hard, small, and frequent, but always soon becoming weak, soft, quick, and unequal, and frequently intermitting; anxious respiration, attended with frequent sighing; fœtid breath; the tongue foul, sometimes dry, chapped, and of a black colour, with fordes about the teeth; generally great thirst, but when the disease takes on a more malignant form, there is no thirst at all; uneasiness within the head; a yellowish cast of the eyes, which sometimes appear full, heavy, and somewhat inflamed; universal pain; pulsation of the carotid and temporal arteries; if the patients do sleep at all, they are not refreshed by it; but in general there is great watchfulness, tinnitus aurium, delirium, coma, subsultus tendinum; loose, offensive stools; viscid fetid sweats; urine likewise in general fetid, and high coloured, but sometimes pale; hemorrhages from the nose, and other parts; universal livid and petechial eruptions; numerous and dark coloured aphthæ; and hiccup.

It is however not to be expected, that the same symptoms will always be met with in this fever; for this disease assumes a great variety of appearances. In general it is seldom simple, but mostly complicated with a morbid condition of the primæ viæ; sometimes in the beginning it puts on the appearance of an inflammatory fever; the pulse is hard, full, and quick; there is rigor, head-ach, and an apparent increased action; more frequently it is complicated with the nervous fever, to which now and then a catarrhal affection of the body accedes: in

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these cases the fever is of the mixed kind, and named putrid nervous, or malignant catarrhal fever.

The prognosis of this disease differs according to the different symptoms observed. The favourable signs are scabby eruptions about the nose and lips; deafness, when it comes on in the decline of the disease; the eruptions becoming red, and inflamed; a moderate diarrhœa, attended with relief of the head; a soft, moist skin, with gentle warm sweats; concocted urine, with a whitish sediment; a more strong and equal pulse; free respiration; and return of the senses. The dangerous are when the patient is scarcely able to support himself for a moment in the same position, on account of the extreme debility of the body; a great despondency and dejection of mind; or, what is still worse, an uncommon degree of insensibility, and want of apprehension; a dry, black, and chapped tongue; numerous black aphthæ; livid petechial eruptions; a chewing motion of the jaw; a constant fumbling with the hands; plucking the bed clothes; tremulous motions of the tongue and lower lip; difficult respiration; no thirst; partial clammy sweats; tension of the abdomen, with loose fetid stools; cold extremities; delirium; stupor; hiccup; a very quick, fluttering, weak, irregular, and intermittent pulse; and the involuntary discharge of the urine and fœces.

With respect to the treatment of this disease, in cases where a congestion of the blood towards the head takes place, the pulse is tense, and there is a tendency to inflammation, it may be proper, that
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the head should be relieved by the application of leeches, or cupping glaffes, or by the taking away a few ounces of blood from the jugular vein; but it is to be observed, that bleeding here is indicated only to remove the accumulation of blood in a vital organ; but that venesection is by no means capable of taking away the morbid cause, for the removal of which a treatment opposite to the antiphlogistic regimen is requisite. This operation should therefore be managed with the greatest caution; for, after a copious bleeding, the pulse often sinks so low, that it can never be raised again; and, at the same time that we take away blood from the head, the vis vitæ of the general system should be supported by the use of tonics and stimulants. The putrid fever is usually attended with sordes in the primæ viæ, these are to be cleansed by an early use of emetics and purgatives, which last should be of the neutral and acescent kind, especially in cases where the hypochondria are tense, and there is a great determination to the bowels. The alimentary canal being thus cleansed, recourse is to be had to the use of tonics and stimulants. A plentiful use of rhenish wine should be recommended to the patient, in order to counteract the tendency of the blood to dissolution by stimulating the vis vitæ. The bark should likewise be given in the largest doses, without waiting for either intermission or remission; for if the practitioner carefully wait till there are distinct remissions, he will frequently lose the opportunity of saving the patient's life. The cinchona in substance would no doubt answer the purpose best, but as the weak state of the stomach can but rarely bear it, a very strong decoction of the

bark should be given, which, in cases of urgency, may be made more powerful by mixing in it some fine powdered bark, and by the addition of its extract, and tincture. In cases of simple putrid fever, the vitriolic acid should be given along with the bark; whereas, where the tendency to putrefaction is not so extreme, and the fever partakes of the nervous character, the vegetable acids are preferable to the fossile ones. If the bark should bring on costiveness, evacuations should be procured by adding small doses of rhubarb to it; or, what is much better, by gentle laxatives and emollient glysters, which, beside diluting the noxious matter contained in the large intestines, often prevent the griping and swelling of the belly from taking place. If the bark occasion a diarrhœa, this is to be stopped by the addition of terra catechu, salep, and small doses of opiates: when the contents of the stomach should be continually thrown up again by violent vomiting; the same remedies we have spoken of in the nervous fever on this subject are useful here likewise. Profuse symptomatic sweatings are obviated by infusion of sage, by a free use of wine, by a mixture of equal parts of alcohol and vitriolic acid, by the bark combined with alum and the fossile acids, and by taking the patient out of the bed, and exposing him to cold air. Symptomatic colliquative diarrhœa may be moderated by the use of opiates, by wine and bark, by alum whey, and by the root of the leopard's bane.

The food should be vegetable, acescent, and of the easiest digestion; the drink ought likewise to be acidulated; the air of the patient's room should be kept

kept as pure, and well ventilated, as possible. To prevent a relapse, the habit is to be strengthened by light and easy digestible food; by gentle exercise on horseback; by the use of bitters, aromatics, wine, and chalybeate waters.

In the cure of this disease I have not spoken of keeping up a gentle diaphoresis by the addition of small doses of emetic tartar to the bark, which has been recommended by some practitioners; for the diaphoresis is only of use in as far as it sometimes proves a crisis of the disease. The crisis, we know, is brought about by the *vis naturæ medicatrix*; and the morbid matter is expelled the body by different emunctories in different cases: it is much better, therefore, to support the *vis vitæ* by the due use of tonics and stimulants, and to leave to nature the choice of the emunctory for the expulsion of the morbid matter. In cases where there is a determination to the skin, this may be encouraged, by giving the sp. Mind., the sp. nitr. dulc., or any other gentle diaphoretic, along with it; but the practice of combining small doses of emetic tartar with the bark ought to be laid aside, for from what I have seen, I am perfectly satisfied, that it weakens the tonic power of the bark, and often does a great deal of harm.

But though these remedies seldom fail to effect a cure, when proper attention has been paid to the disease in the beginning, yet when the fever has been ill managed, or the putrid disease is complicated either with a catarrhal disposition of the body, or with the nervous fever, or with them both, it puts on a more dreadful appearance, and deserves justly the name of malignant fever. Here the *vis naturæ medicatrix* being

being incapable of resisting the violent action of the morbid stimulus, the whole system appears to be extremely relaxed; the patient is unable to support himself in one position for a single moment; the slightest motion of the body occasions a fainting; the pulse is weak, fluttering, and intermittent; the respiration is anxious and difficult; the tip of the nose, the lips, and the nails, assume a black colour; the tongue is likewise blackish; deglutition is impeded; the extremities are cold; clammy cold sweats, coma, insensibility to external objects, convulsions, and subfultus tendinum appear. In these cases, the cinchona and wine, though they are the most powerful tonics and cordials to procure a permanent stimulus, and to strengthen the habit, have not stimulating powers enough to rouse the vital principle into action; but recourse is to be had to the high diffusible stimuli, such as camphor, ammonia, musk, asafœtida, valerian, castor, serpentaria, contrayerva, glysters of the cinchona with camphor, blisters, fomenting the body with cold water and vinegar, and taking the patient during the height of the fever out of his bed, and carrying him into the open air; a remedy the use of which, even in the most urgent circumstances, has been proved beyond all doubt, by the numerous observations of the celebrated Dr. Lettsom on this subject. As the nature of the remedies recommended clearly shows, that they are not to be used indiscriminately, and that the stimulus of the medicine exhibited should be suited to the condition of the patient, we will attempt to point out under what circumstances the above remedies may be advantageously used.

If the pulse be small, weak, soft, and equal; if the extremities be cold; if the patient lie in a comatose state; if there be an insensibility to external objects, a want of apprehension, and an extreme weakness of the system; camphor, given from a ʒß to ʒii in the twenty-four hours, the serpentaria, the contrayerva, wine, and arnica are to be exhibited. But it ought to be observed, that the dose of the remedies ought to vary according to the circumstances: particularly practitioners ought to be cautious in the use of camphor; for if the excitement be unluckily carried too far, congestion of the blood towards the head, redness of the face, convulsions, and mortal phrensy, are not unfrequently the consequences; it is therefore the safest way to begin with small doses, from three to six grains, in order to see how the patient bears it, in cases where the symptoms are not very urgent.

In cases where the action of swallowing is impeded, repeated glysters of a very strong decoction of the bark combined with camphor; the wrapping up of the body in sheets dipped in spirits of wine, vinegar, and water; the exposition of the patient to cold air; and the free use of blisters, now and then save life.

If the pulse be soft, fluttering, unequal, and intermittent, camphor should not be given; but volatile alkali, castor, the sp. c. c., asafoetida, and valerian, are most likely to prove beneficial. Lastly, if the skin be hot and dry; if the urine be pale; if the muscles of the face be thrown into convulsive motions; if there be subsultus tendinum, and a small, weak, and somewhat hard pulse; musk is the only

only remedy in which we can trust. It is true, that some practitioners assert, they have found no benefit from musk, but the numerous observations of Quarin, Vogel, and other celebrated physicians, put the efficacy of this remedy beyond all doubt: and from what I have been able to observe myself, I am perfectly satisfied, that the inefficacy of the musk in the hands of some practitioners has been owing either to it's being adulterated, it's not being given in due doses, or it's being used under circumstances, in which recourse should not have been had to it. For as the quantity in which it should be given, and the intervals between the different doses, are carefully to be suited to the state of the patient, it should be exhibited from five grains to $\mathfrak{z}i$, and repeated from every half hour to every three hours, according to the greater or less urgency of the symptoms.

Though blisters are of no use in the beginning of the disease, yet, when the fever puts on a more alarming appearance, or is complicated with the nervous fever, in order to support the *vis vitæ*, and to rouse the vital principle into action, they are freely to be applied, and are often succeeded by happy effects. The place of their application should be the extremities, the temples, behind the ears, at the neck, and on the head itself, according to circumstances.

As soon as by means of the high diffusible stimuli, the *vis naturæ medicatrix* has been sufficiently excited, the stimulants of this kind, at least of the animal and mineral kingdoms, are to be laid aside; for if they were longer continued, they would often
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do a great deal of harm; they have all done what is to be expected from them, by removing the irregular convulsive motions, and supporting the *vis vitæ*; their stimulus, though powerfully operating on the system, yet is but a temporary one; they afford but a transitory excitement of the vital principle, and are incapable of giving a permanent strength to the patient; they ought therefore to be changed for the use of wine, bark, serpentaria, and alum, the most powerful remedies we possess for strengthening the habit.

If the putrid fever prove fatal, life is destroyed in three ways :

1. The vital principle, being extremely weakened by the violence of the noxious power, becomes at length wholly abolished by the continuance of the morbid action.

2. The putrid fever is frequently attended with spurious inflammations of the *primæ viæ*, quickly running into gangrene; in which case the patients are carried off by a mortification of the stomach and bowels.

3. The morbid matter is not unfrequently deposited by metastasis on the vital organs, especially on the brain, and lungs, in which cases the patient is either suffocated, or dies from an apoplectic fit.

The fevers of which we have hitherto spoken, though different as to their degree of violence, and operating on different organs, all agree in this, that they originate in the debility of the system.

But though the fever mostly depends on a weakened state of the body, yet an increased action of the system, under some circumstances, likewise produces fever, which has been called

The simple continued and inflammatory fever. This disease is attended with the following symptoms: a sense of lassitude and debility; pain universally felt in the bones, but more severely in the shoulders, back, knees, and head; an intense heat, with redness of the skin, especially of the eyes and face, preceded by rigor, dryness of the tongue, mouth, and fauces; unusual thirst; costiveness; dry skin; high coloured urine, voided in a small quantity; frequent, full, and strong pulse; though sometimes small, and hard; quick and laborious respiration; great uneasiness, and anxiety; restlessness; and delirium.

The prognosis of this disease should be taken from the degree of violence of the morbid stimulus, and the strength of the patient. The favourable symptoms are, a free respiration, an equal, soft, full, and less frequent pulse; a copious sediment in the urine; moistness of the tongue; softness of the skin, with moderate heat; moderate general sweats; slight diarrhoea; a plentiful hemorrhage from the nose; and the returning of the patient's senses. On the contrary, an unfavourable termination is to be expected, when the pulse is very quick, weak, and hard; the respiration frequent, and anxious; the delirium permanent, with great watchfulness; the extremities cold; the urine of a livid or black colour; when a few drops of blood ooze out from the nose; when there are an hemoptoe, a sense of suffocation without swelling of the throat; frequent,

quent, loose and offensive stools; profuse colliquative sweats; convulsions, and involuntary evacuations.

The cure of the inflammatory fever consists in lowering the increased action of the system by bleeding, evacuating the *primæ viæ*, and determining to the skin by small doses of antimonial preparations, *sp. Minderi*, &c.; by a plentiful use of diluents and acescent drinks, and by a low, spare, and vegetable diet.

In cases where there is local pain and congestion of blood, the application of some leeches, and the use of blisters, will relieve the complaint. The bleeding should be proportioned to the state of the pulse, the temperament and strength of the patient, and the violence of the symptoms. The quantity of blood that is usually drawn from the patient is from ten to eighteen ounces. In cases where the inflammatory state of the body is strongly marked, and the patient is of a strong full habit, it is much better, for moderating the violent action, to take away at once fourteen or eighteen ounces of blood, than to draw off even double the quantity at different intervals. Even a small hard pulse, with an apparent debility of the system, does not forbid bleeding, if the other symptoms indicate it; as the oppressed pulse rises upon the use of the lancet. But as in these cases it is often difficult *a priori* to determine, whether bleeding be requisite or not, the physician should here always be present at the operation, in order to know what effect it has upon the pulse; for if he had unluckily mistaken a weak pulse

pulse for a small and oppressed one, the consequence of a copious bleeding would be the degenerating of the disease into a putrid fever; which is by no means an unfrequent occurrence, in consequence of the antiphlogistic treatment being carried too far. If the inflammatory symptoms do not give way on the first bleeding, it should be repeated as often as the symptoms require it; and though it is best to take away the requisite quantity of blood as early as possible, yet after the fourth or fifth day bleeding may be proper.

But it is to be observed, that, though sometimes the disease does not yield except to repeated bleedings, in general one or at most two venesections, in conjunction with other remedies, will prove quite sufficient to reduce the increased action; nay, that in many cases, on account of the action being but little increased, and the delicate habit of the patient, the quantity of blood taken away ought not to exceed from six to ten ounces. As fordes of the *primæ viæ* are often joined with the inflammatory disposition, recourse should be had to vomits, if the stomach be affected. At the same time the system is to be lowered, and the bowels kept clear, by the neutral salts, cream of tartar, nitre, manna, cassia, and tamarinds; and a determination to the skin may be kept up by adding to the neutral salts small doses of emetic tartar. But much of the cure consists in giving the patient plentifully to drink of diluents, and acescent liquors, such as cooling juleps, with cream of tartar, nitre, simple oxymel, acid of tartar or *sp. vitrioli*, lemonade, &c. The diet should be a spare vegetable one, and the room
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in which the patient lies, should be large and airy, and kept cool.

The simple continued fever, or synocha, does not differ from the inflammatory but in degree. It seldom requires bleeding, except in full plethoric habits; but is usually subdued by evacuating the primæ viæ by eccoprotics; by encouraging a gentle diaphoresis; by joining small doses of the antimonial preparations with the purgatives; and by diluent acescent drinks, taken in a large quantity.

When treating on the putrid fever, I observed, that the disease sometimes in the beginning puts on an inflammatory appearance; but that, if the physician treat it as an inflammatory fever, the pulse will sink very often considerably, and the patient not unfrequently fall a victim to such a treatment. In order to avoid any mistake of this kind, in doubtful cases the blood should be drawn but in small quantity, and the physician should always carefully attend to the character of the prevailing epidemic, the habit of the patient, his manner of living, and the place of his residence; for in the country, where the people generally live more in conformity to the laws of nature, diseases partake much more of the inflammatory character, than in large towns; where the air corrupted by the great number of people crowded together, the luxuries of the table, the indulging in tepid drinks, and the numerous ladies of the town, take pretty good care, that the fevers the physician has to cure are generally of the low kind; at least have but seldom so much of the in-

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flammatory cast, as to require repeated bleeding, to moderate the increased action of the system.

If the inflammatory fever terminate fatally, the patient may die in four different ways.

1. The vital principle is extinguished by the violent operation of the morbid stimulus; in which case the patient sometimes expires under the last efforts of the *vis vitæ*, that is amid convulsive motions; or, which is more frequent, he is destroyed by the extreme relaxation and atony of the body, the natural consequences of the too great irritation of the system.

2. A metastasis of the morbid matter, it being deposited on some internal organ, occasions death.

3. Sometimes the patient is carried off by a large secretion of coagulable lymph, which prevents the viscera from performing their usual office.

4. But the disease mostly kills by inducing inflammation and gangrene of internal parts.

All the idiopathic fevers, though numerous distinctions and divisions have been made of them by the different writers on the subject, may be reduced to one or other of the kinds of which I have spoken. I cannot, however, here forbear to say a few words on the catarrhal fever, though it is not an idiopathic disease, but a symptom of the catarrh: and the less, as, according to the bills of mortality, so many patients are yearly carried off by this fever.

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The fact is, that the simple and true catarrhal fever is a mild disorder, and, when properly treated, is always unattended with danger; though it's neglect may give rise to peripneumony, and even to phthisis itself, and thus ultimately destroy the patient; yet the disease never immediately leads to death.

But this catarrhal fever, being differently modified by the character of the prevailing epidemic, is often joined with a bilious, putrid, nervous, and inflammatory disposition of the body; and, being thus complicated, frequently destroys the life of the patient.

The simple catarrhal fever is known by an uneasiness within the head, watery inflamed eyes, a defluxion of sharp tears, deafness, tinnitus aurium, and a discharge of serous humour from the nostrils, which on account of it's sharpness occasions frequent sneezing. The treatment consists in avoiding cold, living chiefly on vegetables, keeping the body open by gentle eccoprotics, making use of cooling acescent drinks, and gentle diaphoretics; to which this slight disorder readily gives way.

With respect to the symptoms, prognosis, treatment, and manners of killing of the catarrhal fever, when in it's complicated state; the disease puts on such a variety of appearances, according to the different morbid condition with which it is complicated, that no general rules can be laid down with regard to them. The treatment should altogether depend on the character of the prevailing epidemic

and the habit of the patient; the practitioner will however never be at a loss, in any complication whatever of the catarrhal fever, if he be well acquainted with the general principles of physic, and know how to treat the bilious, putrid, nervous, and inflammatory fevers.

Thus we see, that fevers, though assuming different forms, and attacking the system with different degrees of violence, yet all originate either from increased action; or, which is much more frequently the case, from a debilitated state of the system. To the former belong the true inflammatory fever; the catarrhal inflammatory one, and some vernal intermittents; which now and then partake of an inflammatory character; in all which cases, the antiphlogistic treatment, in a greater or less degree, is to be pursued. The intermitting, the bilious, the putrid, and nervous fever, are all owing to the latter; and are to be cured by having recourse to the tonic stimulating plan. It was however necessary, to take a particular view of each of them; as the stimulus of the medicine to be used ought to be suited to the different degree of the weakness of the system.

ORDER II.

Febrile Diseases.

THESE diseases form a considerable part of the acute distempers, especially since the doctrine of the *exanthemata* has been so much improved by the moderns;

moderns; though it is greatly to be regretted, that authors do not better agree in determining the different kinds of *exanthemata*, and that one makes use of this division, another of that, so that no two authors are found, who do not dissent upon this matter in one point or other. Dr. Stoll admits no other primary *exanthemata* than the small-pox and the measles, and thinks that all the rest are always symptomatic. It is foreign to the design of this work to treat separately of each of the *exanthemata*; and the more as there exists a great analogy among them all, especially with regard to their treatment and general causes of death; therefore I shall speak of all the exanthematous diseases together, so that having premised a general view of them, I shall inquire into the question, whether the *exanthemata* be fatal of themselves, or not; which being determined, I shall endeavour to show in how many ways they may prove mortal to mankind.

As to the first, the *exanthemata* are commonly divided into pustulous, and maculous, the former are the small-pox, the miliary fever, the nettle rash, and the plague: the measles, the scarlet fever, the petechial fever, and the erysipelas are enumerated among the latter. This division however is not founded on the observation of nature; as some *exanthemata*, which commonly present themselves in the form of maculæ, exhibit sometimes pustules, or vesicles instead of them. This is proved not only by the vesicular erysipelas, but likewise by the measles, which, though producing small pustules in the face, exhibit maculæ in the other parts of the body;

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thus clearly proving, that there exists no essential difference between the maculous and the pustulous eruptions. Besides, the observations of physicians on the variolous fever without the small-pox evidently show, that the contagion of the small-pox may be eliminated out of the body without any pustules making their appearance on the surface*; so that, when the inoculation of the small-pox is performed, if only the due change of the wound, together with a fever, and the other characteristics of the small-pox, happen in the usual time, we may be certain, that the patient has really had the small-pox. The same is to be said of the pestilential contagion, which, according to the testimony of the learned Orræus, is likewise in it's commencement not unfrequently carried off by the insensible perspiration†. Therefore it is evident, that neither maculæ, nor pustules constitute the essential character of an *exanthematous* disorder, but that it is only requisite to it, that the contagion be deposited at the surface of the body, and, having there undergone a certain process by means of the cuticular vessels, be at length carried off by insensible perspiration, like an excrementitious matter.

Thus it seems highly probable, that any contagion whatever being taken up into the system and mixed with the blood, the vital powers, as in many

* Sydenham *Opera omnia*, sect. 3, cap. 3, p. 162: Ludwig, l. 1, part 1, cap. i, subsect. vii, p. 79: and Burserius, l. 1. vol. ii, pt. 1, cap. ix, p. 322,

† Vogel, l. 1, ii theil, kapitel ii, p. 162: and Orræus *de Peste, quæ Anno 1770 in Jassia, et 1771 in Moscu grassata est Experientiæ* 17, *Petropoli* 1784, p. 81, 4to.

other cases, deposit the morbid matter by a certain inexplicable affinity, as it were, either at the surface of the body or at the glands, the latter of which is frequently the case in the plague: the morbid matter being there deposited, when not discharged by the insensible perspiration, continually stimulates the vessels, with such effect, that their structure is changed; the vessels, thus altered in their manner of acting, react upon the morbid stimulus, change the contagious matter, and, at length secrete a substance very different, according to the different contagion, and the various state of the health of the subject, and exhibiting maculæ, pustules, or imposthumes, according to the various circumstances, for the secretion, like all the other vital powers, is always in the compound ratio of the structure of the secreting organs, and the stimulus applied.

All the phenomena, with which the *exanthemata* are attended, strongly corroborate my opinion, as Nature follows the same laws, both in the small pox and in the other *exanthemata*, as in all the other secretions: for not to mention, that the small pox is indeed nothing, but small abscesses produced by the variolous contagion, and spread over the surface of the body: if, for instance, the inflammatory state be too violent in the small pox, the inflamed small pox cannot pass on to a suppuration, before the tone of the vessels is lowered by bleeding; whereas, if the degree of vital power requisite to a good suppuration be wanting, an acrid humour is secreted instead of a mild purulent matter, which taking various forms, according to the different degenerated actions of the solids, gives rise to the ichorous,

lymphatic, and bloody or gangrenous small pox; for what else are these species of malignant small pox, than so many depraved manners of acting of the secretory organs? Hence, if we can succour the vital principle by means of powerful stimuli in such cases, a good purulent matter will often be quickly secreted instead of a depraved humour; which evidently shows, that the condition of the matter in exanthematous diseases depends solely, as well as all the other secretions, upon the action of the vessels.

As to the second, the exanthematous disorders being thus generally noticed, I must next inquire into the question, whether they bring on death of themselves. In answer to this question, I say, that I am of opinion, that all the exanthematous eruptions are to be looked upon as diseases, if not mild, at least not dangerous; but that their contagions are not unfrequently modified both by the complication of the epidemic constitution, and by various other accidental circumstances, in such a manner, that they prove very fatal, and make great ravages among mankind. As I doubt not, but such an answer will seem questionable to most physicians, I will explain the reasons, which have induced me to embrace this opinion, leaving it to them to judge of their sufficiency. For instance, if the small pox be mortal in it's own nature, the danger must be inherent in the contagion itself: now the contagion itself is either always the same, or is susceptible of a change; if the contagion itself can be changed, the natural consequence must be, that the altered contagion affects the animal body in a different manner, and produces other alterations
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in it; but if it cause other alterations in our body, then another effect will take place, that is variolous matter will no longer be deposited by the secretory organs, but some other; but if another matter be deposited at the surface instead of the small pox, all idea of the contagion of the small pox vanishes. It is requisite therefore, that the contagion of the small pox must be always the same; but it is beyond all dispute, that the same morbid cause, when applied to a sound body under the same circumstances, must always produce the same effects. If the contagion itself of the small pox be thus found to be always the same; if it always produce the same effects, when administered under the same circumstances; it follows of course, that the disorder of the small pox, if mortal of itself, brings on death, or at least the danger of it, by it's usual phenomena; because the other symptoms are owing not to the small pox itself, but either to the epidemic constitution united with it, to the previous ill health of the subject, or to other accidental causes. Now the usual phenomena of the small pox are undoubtedly by themselves unattended with danger, provided a proper regimen be employed. But, if the contagion itself of the small pox be always the same; if it always bring on the same disorder, under the same circumstances; and if it's usual phenomena be not dangerous; it is evident, that the other symptoms, often occasioning danger and death, are not to be attributed to the small pox itself, but to this disease being joined either with the epidemical constitution, or with some other morbid state, by some contingent circumstance. Thus the sum of what I have hitherto proved amounts to this, that the
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small pox, by itself, without any complication either with the epidemic constitution, with the previous ill health of the patient, or with some other contingent cause, is never attended with danger.

What is here proved by sound reasoning is confirmed by the observations of physicians, as they all agree, that only general rules can be laid down for curing the malignant small pox, and that various medicines ought to be given, according to the different circumstances in various cases, so that Dr. Stoll, leaving the small pox to itself, has not unfrequently performed the whole cure by purgatives combined with emetics *. It is sometimes advantageous to employ stimulating medicines opposite in their nature to the contagion of the small pox; which again shows, that the malignity of the disease ought to be derived not from the contagion itself of the small pox, but either from the epidemic constitution, or the peculiar condition of the patients. In fine, inoculation itself affords an argument, that clears this matter of all doubt: for if the inoculation be performed with matter, taken from patients labouring under a severe kind of the small pox, or even from the body of one killed by this disease, it nevertheless, *ceteris paribus*, succeeds as well as otherwise; and the disease proves as mild, as when the inoculation is performed with matter taken from the mildest sort of the small pox †: we ought

* *Rat. Med.* part ii, p. 153.

† See, the excellent treatise on the small pox, written by Dr. Bicker, *het zevende deel van het Zeeuwsche Genoodschap der Wetenschappen*

ought only to be cautious, that the patient, from whom the matter is taken, does not likewise labour under some other distemper equally contagious, which may be communicated to the inoculated subject, as experience has proved. May it not then safely be concluded, that the contagion of the small pox does not prove mortal, but from some accidental cause? This law, as a general rule of nature, holds good even with respect to the plague itself. It may seem paradoxical for me to maintain, that this scourge of mankind is not in itself mortal; but the following arguments may be adduced in support of my opinion.

1. It proves nothing, that the plague, when epidemic, makes, in general, great ravages; as the small pox, before inoculation was invented, swept away almost the seventh part of mankind, according to the common calculation, and when it first enters any country it is not much less destructive than the plague; for the small pox has raged with so great violence in *Siberia*, that whole provinces have been almost totally deprived of inhabitants*.

2. The plague, though often joined with a putrid fever, is yet by no means a putrid disease; as the learned *Orræus* observes, that the carbuncles are free from all stink, and putrescence, and that no

Weetenschappen, p. 18, who inoculated his own children, and several others, with variolous matter taken from a dead body, with the utmost success: and *Vogel*, l. l. ii Theil, kapitel ii, seite 201, where many such instances are recorded.

* *Samoilowitz Mémoire sur l'Inoculation de la Peste*, p. 14 and 15, *Strasburg*, 1782.

mark of a tendency to putrefaction manifests itself in this disorder when simple *; yet the plague, in the same manner as the small pox and the other *exanthematous* disorders, does not always appear under the same form, but exhibits various symptoms, according to the various morbid states with which it is combined. †

3. The plague frequently unites itself with other acute diseases unsuspected by the physician, from which conjunction it's malignity ought on many occasions to be derived ‡.

4. The plague never proves destructive to mankind, without some previous violent epidemic constitution, which seems to subside at the arrival of the plague; but the contagion of the plague is then really joined with the previous epidemical constitution, hence the plague undergoes various changes, and presents itself under various forms, according to the different previous epidemic. For instance, the plague of *London*, which, according to the testimony of *Sydenham* § succeeded to a violent inflammatory epidemic, repeatedly required bleeding; whereas venesections, though sometimes useful in the plethoric, were nevertheless in general evidently injurious in the plague of *Moscow* §, which, according to the account of Dr. de

* L. 1. confect. 1, p. 162.

† Orræus, l. 1. *Experientiæ* 12, p. 66.

‡ *Opera omnia*, sect. ii, cap. ii, p. 104.

§ Orræus, l. 1. *experientiæ* 26, p. 124.

Mertens, followed after a putrid, and nervous catarrhal fever *.

5. Many patients in the plague of *Marseilles* were so slightly affected, that the eruption of the buboes took place without the least symptoms of a fever, and the patients walked about the streets †; which shows, that death is not brought on by the pestilential contagion itself, but by the epidemic complicated with it.

6. The change of seasons, and of the state of the atmosphere, has also the greatest influence on the plague ‡. Dr. Ruffel observes, that the plague is diminished in the winter, increases in the spring, and is at it's height in the summer §. This is more strongly confirmed by the learned Orræus, who speaks in the following terms: “ The plague ravaged principally in the spring, and the autumn, and was always more violent, if the weather continued rainy and warm; on the contrary as soon as the weather became more dry and settled, with a north, or north-east wind, even in the middle of the summer, if it were not entirely extinguished, at least it grew much milder. But the winter approaching, the contagion was gradually diminished, and at length totally destroyed by the continually increasing cold.”

* *Observat. Med. de Febris putridis, ac Peste*, part i.

† *Chicoineau Traité sur la Peste*, spec. v, p. 41.

‡ Mertens, l. i, part ii, cap. i, p. 89, and cap. ii, p. 109.

§ *Natural History of Aleppo*.

7. The plague observes the same rules in it's course as the other exanthematous diseases: for in it's commencement it may be eliminated out of the body by the insensible perspiration; whereas the disorder having proceeded farther, the suppuration of the buboes and the carbuncles, as the only salutary crisis, ought to be promoted with the utmost care*.

8. When the plague appears only sporadically, as often happens, it is found, like the small pox, to be much less pernicious; as then the contagion may often be vanquished in the beginning of the disease, and expelled out of the body by gentle diaphoretics†.

9. The plague, when communicated by inoculation, though even the pestilential fever be epidemic, exhibits much slighter symptoms: hence Dr. Samoilowitz has concluded, and, according to my humble opinion, with the greatest justice, that the plague, like the 'small pox, may be mitigated by inoculation, 'if the body be properly prepared before-hand‡.

10. Dr. Orræus has proved by a great number of observations, that the anomalous and most violent symptoms of the plague, called either malign-

* Orræus, l. 1, *experientiæ* xix, p. 100.

† Orræus, l. 1, *experientiæ* ix, p. 64.

‡ *Mémoire sur l'Inoculation, &c.*, p. 1 to 24: and *Lettre sur les Expériences des Frictions glaciales pour la Guérison de la Peste*, p. 51.

nant or acute, are very often owing to a morbid matter, contained in the *primæ viæ* *.

II. In fine, I must add to all this, that patients labouring under the plague are besides afflicted with despair of the event, and the most anxious dread of death, to which the want of help does not a little contribute, they being forsaken by every body as soon as the disease appears: for it will no doubt be evident to every one, who considers the great influence the violent passions of the mind have even in a mild distemper, that these have likewise a considerable share in the fatal effects of the plague.

Therefore, if the plague follow the same laws, as the other exanthematous disorders; if, as well as the others, it be found different, according to the different epidemic that prevails; if it undergo the same changes as the others from the seasons; if it ought to be treated with different remedies suited to the different morbid causes joined with the the plague; if, when only met with sporadically, it's contagion be much milder, and more easy to be removed: if, when communicated by inoculation, it become milder; if, in fine, they who labour under this disease can often perform their daily occupations; does it not naturally follow, that even the pestilential contagion, when communicated to a sound body by inoculation, would produce a disease by no means dangerous?

Before I proceed to the inquiry into the sources, from which the fatal events of the exanthematous

* *L. 1, confect: xxiv & xxv, p. 215 et seq.*

disorders are to be derived, I cannot but dwell a little upon the question, whether the plague may be prevented, and what is it's proper treatment, when existing: matters, indeed, of the first importance to mankind in general, and more especially to the *ottoman empire*, the inhabitants of which are so often afflicted with this dreadful complaint. To these questions I answer, that though experience has proved, that the plague cannot be prevented without avoiding all intercourse with the sick, and even with the infected air, still, in my humble opinion, if proper regulations be adopted, persons will not be so easily infected, and the fatal events of the plague, at least in healthy constitutions, may always be prevented. In reality, as it is evident from what has been said, that the plague is a mild disease of itself, and only proves mortal by it's complication with some other morbid state, it follows of course, that whatever impedes the complication of the plague with other disorders also prevents it's fatal effects: however, as different and even opposite distempers may be combined with the plague, it is very difficult to lay down a general treatment of the disease: yet, as it appears evident from the above observations, that the complication of the plague with an inflammatory diathesis is very seldom met with; that the disease mostly inclines either to a bilious or a putrid complication; that it's malignant symptoms are not unfrequently to be ascribed to the fordes of the *primæ viæ*; that in fine, the contagion of the plague, when simple, may, in it's commencement, be very often happily discharged from the body by diaphoretics; sound reasoning, confirmed by a great number of practical observations, directs us to proceed

ceed in the following way: let a drachm of camphor be triturated with two drachms of gum arabic; add to these an ounce of sugar, and dissolve the whole in a pint of vinegar added gradually. Let one spoonful of this solution be taken thrice a day by every person, without which, especially during an epidemic, he must never go out in the morning, particularly to visit the sick. The attendants of the sick must take a spoonful of this mixture every two hours; for by this the vital power of the absorbent vessels being properly stimulated, the elective power inherent in their orifices becomes vigorous, and thus the contagion is prevented from entering the body; as it is well known, that camphor renders the action of any contagion whatever on the body difficult. Moreover, the camphor, by it's stimulus, promotes all the functions of the body, especially the perspiration; and the more, as it's diaphoretic virtue is augmented by the addition of vinegar. As it is evident, that the complications of the plague are to be derived from the impeded functions of some organs, and it is also proved, that the contagion of the plague itself may be expelled in it's commencement by diaphoretics, the utility of the above mixture, both in preventing and curing the plague, needs no farther demonstration. Beside this mixture, rhubarb ought from time to time to be employed to keep the first passages clear. In conjunction with these remedies, the drinking of tar-water will be advisable, as this medicine both purifies the system, and destroys in a great measure the susceptibility of persons for contagion.

If, either from neglecting the above rules, or from a strong predisposition to the distemper, not-

withstanding the use of the mixture, any person should be seized with the plague, which, however, I believe will not frequently be the case, let him directly have recourse to a vomit of emetic tartar; for the purpose not only of clearing the first passages, but also of propelling the contagion to the surface of the body. After that, for security, a purgative of calomel is to be administered, to expel by stools any sordes, that may still remain in the bowels. The first passages being thus cleared, a decoction of the bark, mixed with camphor triturated with alkohol, is directly to be given; by means of which the solids are sufficiently strengthened to counteract the morbid stimulus, to expel it from the mass of humours, and to carry it either to the glands or to the surface of the body.

It is obvious, that, when either the patient is very plethoric, or the plague is joined with an inflammatory *diathesis*, the cure must differ. In the first case, a bleeding should precede the other medicines; and in the second, the above medicines must be laid aside, and the plague is to be cured by repeated bleedings and the antiphlogistic treatment, which last case nevertheless but seldom happens.

Thus there is strong reason to believe, that, though the contagion of the plague cannot be prevented, still by employing the above methods, it's contagion may be rendered less infectious, and the fatal effects of this dreadful complaint, if not always, at least in most cases, may be prevented. These, however, are by no means the most effectual remedies for the checking of this dreadful disorder; for the most powerful

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mean of putting a stop to the fatal effects of the plague is no doubt it's inoculation; since, as I shall hereafter prove, it is a general law of nature, that all contagious disorders become milder when communicated by inoculation. Of this we have a striking instance in Dr. Samoilowitz, who, in the plague of Muscovy, attending a russian military hospital, inoculated himself. The consequence was, that the plague came on him, but the symptoms of the disease were much milder, and he got the better of the complaint much more readily than those, who had caught the infection in the natural way. But if the contagion of the plague become milder by inoculation, even when communicated in an hospital during the height of the epidemic, and in an unprepared body, it must naturally follow, that the plague would prove a mild disorder, if it's inoculation were performed on a prepared body, and in the beginning of the epidemic.

With regard to the third: As the exanthematous diseases, though not mortal of themselves, yet often occasion great ravages, it appears, that there must be several causes, by the association of which the exanthematous disorders degenerate from their natural mildness, and become dangerous and mortal: These causes, in my humble opinion, may be reduced to the five following: viz. 1. the epidemical constitution: 2. the time of the year: 3. the age, constitution, and manner of living of the person attacked: 4. the previous ill health of the patient: 5. improper treatment: each of which I shall now briefly consider.

1, The epidemical constitution is to be ranked the first among the means, by which the exanthemata become mortal. Hence the celebrated Stoll advises physicians to attend much more to the epidemic constitution, than to the *exanthemata* themselves*; observing, that, in a bilious epidemical fever compounded with the small pox, he had employed such medicines as the nature of the epidemic itself required, in the same manner, as if no small-pox had been complicated with it, with such success, that, though he had paid no regard to the small pox, and had administered, according to the various circumstances, either emetics or emetic purgatives, nevertheless almost all the patients were restored to health; he farther adds, that he had cured in the same way, and with like success, measles accompanied with a bilious pituitous fever†; whereas the anomalous small pox, and the measles which raged in *England*, in the year 1670, and which the immortal Sydenham has described, were, apparently, of an inflammatory kind, and a strict antiphlogistic method of treatment was required in them‡. Other eminent writers observe the same both of the small pox, and the other exanthemata. Thus, for instance, the celebrated Vogel states, that the malignity of the measles ought almost entirely to be attributed to the epidemical constitution§; and, speaking of the other exanthemata, he says, that only a few general rules can be laid down with regard to the cure of them, but that both the petechial fever, and other exanthe-

* *Rat. med.* part ii, cap. xii, p. 179.

† *L. l.* p. 166.

‡ *Opera Omnia*, sect. iv. cap. v, and vi, p. 187 ad 205.

§ *L. l.* theil iii, kapitel iii, p. 221.

matous diseases should be treated with different medicines, according to the circumstances, and suited to the various epidemics that prevail *. The illustrious Burserius agrees with him, and shows by many examples, that no certain laws can be established for the cure of exanthematous diseases, but that they should be differently treated, according to their various complications †.

2, The time of the year follows next after the epidemical constitution; and to this also the modification of the small pox ought not unfrequently to be ascribed; particularly as the epidemic disease itself undergoes various changes from the different seasons, for which reason, *ceteris paribus*, the malignant epidemics of the small pox mostly happen in the summer, as they are then often complicated with putrid fever. Haller has recorded an extremely fatal complication of the small pox of this kind, which happened in the summer of the year 1735. In this epidemic the pocks were interspersed with black spots; the pustules, easily receding, were flat, pale, and confluent; other symptoms, denoting the torpor of the vital powers, were present; and the stench, both of the breath and the pustules, was intolerable. It is scarcely necessary to mention, that this epidemic would not admit of bleeding, and the antiphlogistic mode of treatment; whereas, the body being properly purged, camphor, administered either in an emulsion, or with nitre, was an efficacious stimulus, to excite the solids to deposit the virus of the small pox at the surface of

* L. l. cap. vi, p. 282 and 296. † *Inst. med. pract.* vol. ii.

the body, and to prepare it there; and by these medicines alone Haller performed the cure*. On the contrary, in the winter, when the habit is more disposed to inflammation, to which moreover the contagion of the small pox naturally inclines, the small pox is complicated, for the most part, with a genuine inflammatory diathesis. In this case repeat bleeding, and the rest of the antiphlogistic treatment, ought to be prescribed; which being properly employed, the patients are for the most part restored to health, as the complication of the small pox with a genuine inflammatory state is the least dangerous of all the modifications of this disorder.

3, Attention ought likewise to be paid to the age, constitution, and manner of living of the patient. If, for instance, a young man of a sanguine temperament, and living very high, be seized with the small pox, it often happens, that, though the prevailing epidemic be by no means of an inflammatory diathesis, the antiphlogistic mode of treatment ought to be pursued, on account of the patient's age and constitution; yet the reigning epidemic is always to be kept in view, because, in such cases, it is frequently complicated, in a greater or less degree, with the inflammatory diathesis. Such a case I have experienced in my own person. Four years ago, being attacked with the small pox, fordes of the primæ viæ were complicated with an inflammatory diathesis; nevertheless, a copious bleeding being premised, and the first passages being properly cleansed by an emetic purgative, a mild

* *Opera minora*, t. III, *Opusc. patkol. obs.* t. iv, p. 350.

kind of small pox broke out, and all went on well till the suppuration; at the commencement of which there unexpectedly arose a strong palpitation of the heart, heaviness, great anxiety, difficult respiration, and a strangury. The medicines prescribed did not lessen these symptoms, and they continued till venesection was performed, by which all the symptoms were completely removed within a few minutes. In such cases, when the requisite bleeding is neglected, an apoplexy, or a suffocation, occasioned by an inflammation of the lungs, carries off the patient, of which the following case, recorded by Dr. Bonnet, is a very evident instance. A german prince, in the flower of youth, of a sanguine temperament, and addicted to high living, was attacked with the small pox. As the fever was inflammatory, or at least united with an inflammatory disposition, bleeding was performed; after which a great number of small pustules broke out, and the patient was relieved in every respect. But the following day, that is, the fifth day of the disease, symptoms of an internal inflammation appeared; and a second bleeding not being permitted, all the medicines administered proved ineffectual, the symptoms grew worse and worse, and at length the prince died on the tenth day of the disease. On opening the body all the viscera were found in a healthy state, excepting the lungs alone, which were seized, for the greatest part, with a violent inflammation; nay an imposthumation had already taken place in the right lobe. Thus it appeared, that the prince was killed, not by the small pox, but by the inflammation of the lungs, arising from an inflammatory crasis of the blood; which demonstrates, that re-

peated bleedings ought to have been employed; a mode of treatment which Bonnet, as appears from the annexed scholion, would have pursued, if the cure had been entrusted to him *. This clearly shows, what a fatal event the neglect of requisite bleeding may occasion.

4, The previous ill health of the patient greatly contributes to render the *exanthemata* malignant and fatal; since it is a constant observation, that infants, in the period of dentition, women with child, or lying in, newly married men, onanists, persons of a bad constitution, or already labouring under acute diseases, are more severely affected with the small pox than other persons. And the reason is evident, as the vital principle, already weakened by different causes, cannot resist the variolous contagion with sufficient force, but, being already greatly debilitated, sinks under it. The same is equally true of all the exanthematous diseases, which, in the same manner as the small pox, do not unfrequently kill such subjects.

5, Finally, improper treatment is to be enumerated among the causes, which often render the *exanthemata* malignant and fatal. For if too great an orgasm of the blood be excited by wine, theriaca, or other calefacient remedies; which not unfrequently happens among the common people: if, on the other hand, the *exanthemata* be prevented from making their appearance on the surface by an imprudent and sudden exposition to cold air; or, when already appearing, be made to disappear, and

* *Sepulchretum Anatomicum*, t. iii, lib. iv, sect. iv, obs. lx, p. 230.
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the action of the cutaneous vessels on the contagious matter be impeded, by the application of too great cold, as may easily be done, both in the measles and the scarlet fever, or if the vital powers be too much weakened by the copious évacuation of blood: in a word, in every case, in which a regimen, either too stimulating or too antiphlogistic, has been pursued, the *exanthemata* may be rendered malignant and fatal; so that, if nature, either alone or succoured by physic, do not repair the error, life soon ceases, and the patient dies, not from the malignity of the *exanthematous* disorder itself, but from the use of remedies much worse than the disease.

From what has been said the following consequences may be drawn.

1, The reason, why the *exanthematous* disorders, when communicated to a healthy person by inoculation, constitute a disease not in the least dangerous, is to be explained only from this, that their contagions are then applied by themselves to bodies properly prepared, without the least complication either with the reigning epidemic, or with any other morbid stimulus. This reason, though it in a great measure accounts for the benignity of the inoculated contagions, yet seems not to be wholly sufficient to the explanation of the fact. For, when any contagion is communicated to the body by inoculation, it produces first a local disorder, and is not taken up into the system till after it has been previously animalized as it were; whereas, when a person is infected in the general way, the contagion enters the system without any assimilation taking place: and

my worthy friend, Dr. Woodville is of opinion, that the mildness of the disease is in great measure owing to this.

2, No certain practical rules can be laid down in the exanthematous diseases, but different, and even opposite medicine ought to be employed to cure them, according to the circumstances.

3, As specifics do not prevent distempers, but only remove the character of a disease already existing; and as, moreover, the *exanthemata* owe their malignity only to accidental causes, and are to be treated with very different medicines, according to the different morbid diathesis with which they are complicated; it follows, that it is impossible to discover a specific for any *exanthematous* disease whatever. For who could fancy to himself a remedy provided at the same time with an antibilious, an antiseptic, and an antiphlogistic virtue? Yet such a specific ought to have all these powers; since there exist many cases, in which the whole cure of the *exanthemata* is performed by one of them.

4, The vulgar opinion, that bleeding is prejudicial after the eruption of the small pox, is not only unsupported by observations of nature, but is often the occasion of death; whereas it appears, from what I have said above, that bleeding may be performed during the whole course of the disease with safety.

5, That no stage either of the small pox, or of any other *exanthematous* disorder, forbids the use either of emetics, or emetic-purgatives, when the complication

complication of the disease requires such remedies; but that emetics, and the rest of the antibilious treatment ought to be administered in all the stages of the *exanthemata*.

In fine, I must farther observe, that, though the *exanthemata* do not bring on death of themselves, or prevent the use of medicines proper for the disease with which they are complicated, yet some precautions are always to be observed in the cure of them, according to their different nature. They, for instance, the measles should by no means be exposed to the cold air in the same manner as the small pox; since the contagion of the measles, less fixed than that of the small pox, much more easily disappears from the surface of the body, and when repelled not unfrequently produces a mortal translation. Besides the state of the lungs ought always to be kept in view in this contagion, especially in weak subjects, since many catarrhal symptoms as it were accompany, for the most part, the measles, and their morbid matter principally inclines to a *metastasis* on the lungs. In the scarlet fever, the diaphoretic regimen ought to be continued during a long time; for, though the disease be vanquished, if the convalescent too soon neglect the diaphoretic regimen, or imprudently expose themselves to cold air, they fall into the most serious maladies, by which many of them die. The same may be said of all the other *exanthemata*, in which likewise various precautions ought to be observed. In general, however, to keep the patient on a strict diet, to take care not to expose him to sudden cold, and to keep up a gentle determination to the skin by a plentiful use of diluents, is all that is required in simple exanthematous diseases.

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The manners of dying from the exanthematous diseases are numerous ; for, since the *exanthemata* are not mortal of themselves, but only bring on death, on account of another morbid state being united with them, it follows of course, that there are as many different manners of dying from the exanthematous diseases, as there exist morbid states with which it is possible for them to be complicated : therefore, if, for instance, the *exanthemata* be united with an inflammatory fever, the patients die either from gangrene ; from the secretion of coagulative lymph in the vital organs, by which their function is impeded ; or from a local inflammation : whereas, if the *exanthemata* be conjoined with a putrid fever, life is extinguished either by the too great violence of the stimulus, by a spurious inflammation, or by a *metastasis* at the noble parts, in the same manner as in a putrid fever ; so that the manner of dying from the *exanthemata* is different, and to be explained from what has preceded, or from what follows, according to the different disorder united with them.

A P P E N D I X.

AS a kind of appendix to the febrile diseases, I shall treat here of the rheumatism and the gout, because, though they often exist without pyrexia, feverish motions are frequent attendants of both these disorders ; of course they seem to claim a place among the febrile diseases.

Rheumatism

Rheumatism.

RHEUMATISM is a painful sensation of the joints and the muscular parts between them, brought on in consequence of the application of cold and moisture. It is sometimes confined to one part of the body only; though often several parts are affected at the same time. The disease is distinguished into acute and chronic: the former is attended with considerable pyrexia and inflammation; the latter with little or none.

The symptoms of the acute rheumatism are rigor, lassitude, thirst, watchfulness, acute pains in one or more joints of the body, attended with tumor and redness. Though the disease may attack chiefly one joint, yet in the acute rheumatism the pains generally affect several joints, but usually shifting their place frequently, and having abated in one joint they become more violent in another. The pains are always very much increased on putting the affected parts into motion. The tongue is usually foul, the body costive, the pulse quick, the urine high coloured, and the perspiration suppressed. Sometimes, however, there is a tendency to profuse clammy sweats, but which never afford the least relief. The chronic rheumatism is commonly the sequel of the acute rheumatism, when imperfectly cured either by nature or by art. It has but little of the inflammatory character, and is usually not attended with pyrexia, swelling, or redness of the joints; but the disorder is chiefly marked by irregular and fixed pains in certain joints and muscular parts, increased upon motion, and greatly influenced

enced by the state of the weather. The rheumatic pains always increase toward the evening, and when the patient grows warm in bed. The seat of these pains, and the different symptoms, with which both disorders are attended, serve to distinguish them from the venereal disease; though often in the chronic rheumatism the distinction is very difficult, and a great deal of stress is to be laid upon the moral character of the patient.

The occasional cause of the rheumatism is cold, especially when attended with moisture, and applied to the body when either in any way unusually warm, or with less than its usual covering. Hence the disease is very seldom observed during the heat of the summer; and in the winter it is much less frequent than during the spring and autumn, because the cold is then considerable and constant; though, as the celebrated Dr. Cullen observes, the disease may occur at any season, if vicissitudes of heat and cold be for the time frequent. The predisposing cause of this disease seems to be the natural condition of the human body; for, provided men are not hardened from their childhood so as to brave the changes of the weather, and the vicissitudes of heat and cold, the disease attacks every age, and persons of all temperaments, supposing they are exposed for a sufficient length of time to the operation of the exciting causes. The proximate cause of the rheumatism seems to consist in an inflammation arising in consequence of the insensible perspiration being suppressed by the application of cold and moisture. For the extreme vessels on the surface being constricted by the cold applied,

applied, the blood from which the matter generally discharged by the insensible perspiration was about to be secreted, operates with a specific stimulus on the vessels of the joints, the ligaments, and the muscular parts surrounding them: the consequence of which is, that the *vis naturæ medicatrix* attempts to remove the noxious stimulus by the increased action of the affected parts. Hence an inflammatory diathesis and fever arise in the affected joint; and of this increased action the whole system partakes, if several parts be affected at the same time, on account of the general irritation produced by their affection. This inflammation is of a peculiar kind, it does not terminate in suppuration; but it often produces a secretion of a transparent gelatinous fluid, in ligamentous and tendinous parts, which gives rise to stiffness, and sometimes ankylosis of the joints. This secreted fluid is usually reabsorbed, and rarely produces permanent tumours; but in case it should not be taken up into the system, the absorbents are to be roused to action by topical stimuli; for an opening made in them, in order to let out the contained fluid, has produced ulcers difficult to heal; which effect however might perhaps have been prevented, if the openings had been healed up by the first intention, by the use of adhesive plaster.

The rheumatism is a disease which does not prove fatal, except when a translation of the disorder from the external parts to the internal organs takes place; though without this, on account of the violent acute pains with which it is accompanied,
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it may bring on a hectic fever, and thus ultimately destroy the patient.

In the acute rheumatism the cure should be suited to the nature of the fever, which accompanies the disease. If it be of the inflammatory kind, bleeding, eccoprotics, neutral salts, nitre, sal ammoniac, diluents, and the whole of the antiphlogistic treatment is to be pursued. After due evacuations, the administration of tartar emetic in small doses, the acetated camphor mixture, and the spiritus Mindereri, is to be recommended, in order to keep up a gentle diaphoresis. But if the fever partake of a bilious nature, bleeding rather hurts the patient, and emetics and eccoprotics are the only remedies to be depended upon. Most cases, however, of the acute rheumatism partake of the inflammatory diathesis, and of course require bleeding for their cure; though as the disease does not depend upon a true inflammatory condition of the system, but is the consequence of the general irritation brought on by the application of cold, the increased action is generally not so high in the acute rheumatism as in the true inflammatory fever, and does not require such a strong antiphlogistic treatment. Indeed I am very much disposed to believe, that the reason, why the acute rheumatism so often terminates in the chronic, is frequently owing to the antiphlogistic treatment being carried too far. Accordingly, as soon as the symptoms of general irritation are considerably abated, and distinct remissions appear, though the pain in the affected joints, with redness and swelling, should still continue, instead of persevering in the antiphlogistic plan, the bark should be given with

with freedom, and the symptoms of local inflammations should be removed by applying some leeches to the parts; for as experience proves, that increased action may be produced in some part, at the very same time when the general system is in a debilitated state, the practitioner will often find it very proper, under the exhibition of tonics to strengthen the general habit, to use topical evacuations in order to moderate the inflammatory symptoms in the affected parts.

If a translation of the rheumatism from the external parts to the internal organs should occur; the practitioner ought to attempt to bring the rheumatic matter back again to it's former place, by pediluvia, epispastics, and blisters applied to the external parts; and by giving wine, musk, camphor, guaiacum, ammonia, asafœtida, valerian, and opiates, internally. The *methodus medendi* in such cases should however differ according to the different organ, on which the metastasis took place, and the symptoms produced by it: for if it bring on an inflammatory affection, the antiphlogistic treatment should be pursued.

The chronic rheumatism is either met with in persons of a relaxed habit, or is the consequence of the atony subsequent to the increased action of the affected part. It is to be cured by the tonic and stimulating plan. A great number of remedies are recorded by different authors for the purpose: unluckily, however, no one of them is very certain in it's operation, and no practitioner is always able, *a priori*, to determine what remedy will

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effect the cure ; because the chronic rheumatism is often found obstinately to resist them all. The remedies which either I have used myself with benefit, or have seen successfully employed by others, are the tartar emetic given in small doses so as to keep up a continual nausea, antimonials, cicuta, Dover's powder, the decoction of the dulcamara, mustard whey, and in cases of debility, the bark, wine, and bitters : but especially, the hydrargyrus muria- tus, guaiacum, camphor, and calomel, ammonia, and the flowers of the arnica given in an infusion, with which I have cured cases of chronic rheumatism, obstinate even to the guaiacum and the sublimate. In cases where the body is as it were rendered immoveable by the stiffness and acute pains of the affected parts, I have several times seen a perfect cure performed by two drams of the extract of the blue wolf's-bane, dissolved in two ounces of the vinum antimoniale Huxhami, and given from twenty to eighty drops or more, two or three times a day, either alone or with a decoction of the sarsaparilla.

In cases of paralysis caused by the application of cold and moisture, the tinctura guaiaci ammoniata, mustard-whey, the infusion of the flores arnicæ, in conjunction with the sp. sal. ammon. and the extract of the rhus radicans given from ʒ ii to ʒ ii two or three times a day, in conjunction with blisters, are the most powerful means we possess.

With the use of the internal medicines, the application of topical remedies should be conjoined ; as often these are even more efficacious in removing the disorder than the internal ones. The chief o
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them are pediluvia, blisters, rubefacients, stimulating plasters, electricity, dry frictions, the wrapping up of the affected parts in flannel, the vapour-bath, the warm-bath, the oleum petrolei with camphor, camphor and volatile liniments, the soap-liniment, and the balsamum vitæ externum, consisting of soap, oil of turpentine, and salt of tartar, from which, in different cases, I have seen much benefit derived.

In order to guard against the return of the rheumatism, it is useful to strengthen the habit in general, and the affected parts in particular, by sea-bathing, the cold bath, and the use of tonics. The wearing of flannel shirts and worsted stockings is likewise to be recommended.

If the rheumatism should prove fatal, either the violent acute pains occasion a hectic fever, which carries off the patient, or a translocation of the disease happens to some internal organ. The way in which this disease brings on death, in the latter case, varies according to the organ affected, and the different degree of reaction of the system. Sometimes the patient dies of phrensy; at other times a mortal apoplectic fit is the consequence of the translocation of the disease; not unfrequently suffocation takes place; and now and then an universal spasm puts an end to life.

Gout.

THE gout seems to consist in a debility of the body in general, but more especially of the stomach and absorbent system, in consequence of which, the

food taken not being properly digested, a peculiar degeneracy of the lymph takes place; which no doubt would injure the health of the patient, were it not, that the morbid fluid thus generated is deposited by the *vis naturæ medicatrix* on the smaller joints; more especially of the feet, where, on account of it's specific stimulus, a specific inflammation is produced. This is the description of the regular gout: which is called atonic, when the vital principle has not power enough to convey the morbid matter to the joints. Sometimes, though rarely, nature commits a mistake, and instead of carrying the generated morbid fluid to the joints, it is deposited on some internal part; it is then named the misplaced gout. If the inflammatory state of the joints suddenly and entirely cease, while some internal organ becomes affected at the same time, it is called the retrocedent gout.

The inflammatory action produced in the affected joints by the morbid stimulus is of a peculiar nature. First, it generally attacks only the smaller joints, especially those of the feet, and the great toes, and the joints of the fingers; though in the inveterate gout, there is often hardly a joint of the body that is not on one occasion or other affected, and the disease passes successively from one joint to another. This inflammation also never terminates in suppuration; and it has this peculiarity about it, that, after the disease has frequently recurred, the inflammatory state of the joints usually ends in a secretion of a peculiar fluid, which is deposited on the outside of the joint, and for the most part immediately under the skin; this fluid soon becomes dry and firm, and
passes

passes into concretions of a chalky nature (*phosphas calcis*) which greatly tend to destroy the motion of the joint.

The limits between the gout and rheumatism are not exactly defined by authors on the subject. Both diseases are described by the ancients under the general name of arthritis, and even modern authors often confound them. These disorders, however, may always be distinguished from each other, by paying due attention to the following circumstances.

1, The predisposition to the gout is frequently hereditary, and the disease is generally brought on without any evident external cause; whereas such a predisposition to rheumatism does not exist, and the latter disease always originates from the application of cold and moisture.

2, The rheumatism usually attacks the larger, the gout the smaller joints; and though both disorders greatly contribute to destroy the motion of the affected part, yet the rheumatism never is productive of chalky concretions, or of a nephritic affection, the usual attendants of the inveterate gout.

3, Healthy persons of all ages and temperaments contract the rheumatism: the gout on the contrary attacks only a certain set of people, either predisposed to it by an hereditary disposition, or weakened by some cause or other.

The rheumatism may often be quickly removed ; it frequently attacks but once during life ; at least it never returns, without exposure to the exciting causes ; the gout, on the other hand, if cured at all, is but very slowly remedied ; and, having once attacked any person, it returns at certain intervals, and often without any evident exciting cause.

4, The gout, on making it's first appearance, is generally preceded by symptoms of indigestion ; as lassitude, torpor, dejection of mind, loss of appetite, nausea, vomiting, flatulency, acid eructations, pains in the region of the stomach, costiveness, and other disorders of the *primæ viæ* ; all which symptoms are not met with in the rheumatism, unless accidentally.

5, The gout attacks only the joints ; whereas the rheumatism has 'it's seat also in the ligamental and muscular parts.

6, In the rheumatism the fever is usually the sequel of the general irritation brought on by the parts affected ; on the contrary, in the gout, the feverish motions are often very much abated, when the symptoms of local inflammation appear in the joints.

7, In the chronic rheumatism, the complaint is mostly confined to one part ; in the gout, when inveterate, the disease passes successively from one joint to another, and often changes it's seat.

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8, The urine and stools of gouty patients have a peculiar offensive smell; which alterations, as is well known, are not observed in the rheumatism.

After the symptoms of indigestion, and other disorders of the *primæ viæ*, which usually indicate the approach of the gout, the paroxysm begins with an unusual coldness of the feet and legs, a frequent numbness alternating with a sense of prickling along the whole of the lower extremities, a turgescence of the veins, and an acute pain affecting one foot, most commonly on the first joint of the great toe, attended with some degree of chilliness and fever.

The pains become gradually more violent, affecting the tarsal and metatarsal bones of the foot, with great restlessness of the whole body; towards the morning the parts begin to swell and to inflame, the pain and fever considerably abate, or entirely cease, a gentle moisture on the foot comes on, and the patient commonly falls asleep. The pain and pyrexia return again towards the evening, and the symptoms continue with more or less violence till morning. The mind is very irritable, the tongue is foul, the body costive, and the urine is high coloured, and voided in a small quantity.

After continuing in this manner for some days, the disease goes entirely off, and leaves the patient in very perfect health, enjoying greater vigour and perfection in the functions of body and mind, than he had for a long time before experienced; so that

a regular paroxysm of this disease often contributes a great deal to the cure of other disorders, and to the restoration of the body to perfect health. But though this is true in the beginning of the disease, yet in it's inveterate stages the situation of the patient is a very uncomfortable one; for while in recent cases the returns of the gout are sometimes only once in the course of several years, yet, after some time, the intervals become gradually shorter, the attacks come on annually, or twice a year, and at length they return several times during the whole course of autumn, winter, and spring: and as with the frequency of the fits the paroxysms become also longer; in the advanced stages of the disease the patient is scarcely ever perfectly free from it, except for some weeks in the middle of the summer. There is another circumstance that renders the state of the patient very unpleasant; which is, that, though after the first paroxysms of the gout the affected joints are perfectly restored to their former suppleness and strength, yet, after a frequent recurrence of the disease, they never wholly recover their former state, but remain weak and stiff; and as these effects increase on each return of the disorder, they at length proceed to such a degree as to render the affected joints quite useless.

The remote causes of the gout are either predisponent or exciting. The predisposition to the gout depends upon a peculiar constitution of the body, and is often hereditary; though it may be brought on by the occasional causes themselves.

The exciting causes of the gout all operate by weakening the system in general, and the digestive powers in particular. The chief are a sedentary and studious life, the luxuries of the table, intemperance in the use of intoxicating liquors, excess in venery, excessive evacuations, and the omission of accustomed labour; all which causes, by debilitating the action of the chylopoietic organs, produce indigestion.

The proximate cause of the gout seems to be a debility of the system in general, and of the digestive organs in particular, by which they are incapable of converting the food taken into proper nourishment. The lymph, being specifically altered, specifically operates on the absorbent system; the consequence of which is, that the lymphatic glands, having undergone a certain alteration, secrete a peculiar fluid, which, being deposited on the joints of the extremities by the *vis naturæ medicatrix*, produces the paroxysm of the gout. It is true, this opinion is not supported by dissections of such bodies, as the gout by itself very seldom proves mortal; but as it is drawn from the fullest attention to the symptoms and remote causes of the disease, this theory seems at least to be more probable, than that the gout should be an affection of the nervous system; an idea originating with the immortal Boerhaave, and supported by the great Cullen; for a superficial view of the remote causes of the disease, and the symptoms usually preceding its attack, are quite sufficient to prove beyond all doubt, that the digestive organs, and not the nervous system, are the primary seat of the disease. The more especially as
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all the phenomena observed in this disorder may be easily accounted for from this theory. In the atonic gout, the lymphatics, on account of their debility and irregular action, do not carry to the feet the generated morbid matter: hence the pains and cramps generally observed under such circumstances in several parts of the trunk, and the upper extremities of the body, a dejection of mind, palpitations, and faintings; and as nature always makes an attempt to get the better of the morbid stimulus, the atonic gout not unfrequently terminates in the misplaced gout, the morbid matter being deposited on some internal organ by the irregular motions of the absorbent vessels. The phenomena, with which the retrocedent gout is attended, may likewise be explained without difficulty from the absorbents taking up again and conveying into the system the morbid fluid deposited by them on the joints; the consequence of which must be the sudden ceasing of the inflammatory state of the joints, and a train of different symptoms, varying according to the different internal part, to which the morbid matter is conveyed by the lymphatics. Hence we may also comprehend, why the paroxysm of the gout often so much contributes to the restoration of the body to perfect health; because by it's attack the chylopoietic organs are freed from the morbid stimulus. It is not to be denied, that the paroxysm does not afford so much relief to the patient in the inveterate stages of the disease; but the fact is, on account of the weakened state of the body, the paroxysm is seldom critical, and sufficient to get completely rid of the morbid stimulus: the intention of the *vis naturæ medicatrix* is always the same, in
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all stages of the disease, but by the frequently repeated efforts of nature to unload the system, the strength is gradually exhausted, and the *vis vitæ* is not competent to the completion of the work; and this is the reason why the symptoms of atonic and misplaced gout so often occur in the inveterate stages; for the vital principle not having power enough to carry the morbid matter to the smaller joints of the extremities, the disease falls on internal organs, producing vomiting, diarrhœa, apoplexy, and inflammation of the viscera of the thorax and abdomen, according to the different part on which the morbid fluid is deposited.

But perhaps it may be objected against the opinion, that the gout consists in a debility of the system in general, and of the chylopoietic organs in particular, that the disease generally attacks persons of a full and plethoric habit; and of course a vigorous and plethoric state of the system seems to be the proximate cause of the gout. This objection, however, falls to the ground, on considering, that the gout very seldom attacks the purely sanguine or melancholic, but most commonly men of a choleric-sanguine temperament; that the disorder does not seize persons, though in the highest degree plethoric, unless they have been previously weakened, in some degree, by irregular diet, and an improper manner of living. The strongest men are generally found among the poor; but it is well known, that the gout is very rarely met with among them; the sufferers from this disease being usually men in easy circumstances, who are addicted to the luxuries of the table, which bear very hard upon the stomach,
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and impose upon the chylopoietic organs with much severer duty, than nature has intended they should perform. There is indeed a plethoric state of the system: but it is not the true plethora; it is plethora *ad vires*, or plethora joined with debility; for, on account of their relaxed tone, the vessels do not duly react on the column of blood, and become over distended even by a very slight super-abundance of blood, which would by no means bring on symptoms of plethora in persons of a strong robust habit; it would of course not be a very rational practice, to attempt the cure of this kind of plethora by the lancet; but the symptoms of plethora are best removed by the use of those medicines, which, by strengthening the general habit, restore the vessels to their due tone. In fine, that the plethoric state of the system, frequently observed in those who labour under the gout, especially in the beginning of the disease, is not owing to the energy of the *vis vitæ*, but originates from a certain degree of debility, is put beyond all doubt by the pernicious effects, of which the antiphlogistic treatment has been productive, when carried into execution by the advocates for it in the cure of the gout.

The prognosis of the disease ought to be taken from it's duration, and the age of the patient. If the patient be young, particularly if the disease have been acquired from a bad diet, and irregular manner of living, in a recent case, great hopes of a radical cure may be entertained. But in persons, in whom the gout is hereditary, in people of an advanced age, or in the inveterate gout, the complete removal of the complaint is but seldom within
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the power of physic, and a palliative treatment is generally all that is to be expected from medicines, aided by a proper regimen.

As to the cure of the disease, during the paroxysm of a regular gout, the symptoms should be moderated, which is most effectually done by avoiding all irritation; by keeping the belly soluble; by using a simple diet, and by producing a gentle determination to the skin by small doses of opiates, Dover's powder, the sp. Mindereri, and a plentiful dose of diluents. With regard to external applications, the celebrated Sydenham gave it as his opinion, that the more severe and painful the paroxysm is, the shorter is it's duration, and the intermission is the longer. There is no doubt, but this renowned physician took his idea from nature; it by no means follows, however, from this observation, that, in cases where the inflammatory symptoms run very high, the physician should stand by as a mere observer of nature's operations. On the contrary, sound reasoning and experience prove, that the violence of inflammation weakens the tone of the parts, and thereby invites a return of the paroxysms; and that the application of some leeches to the affected part brings on a considerable relief of the acute pains, and shortens the paroxysm. In all cases of the gout, the surface of the body, but more especially the extremities, should be properly guarded against cold: the affected parts are to be wrapped up in flannel, so as to keep up the cuticular discharge; warm bathing, and emollient poultices to the feet, may likewise be applied with advantage and safety: the opinion; that they sometimes give rise to a retrocession

cession of the gout, seems to be owing to mere prejudice; indeed it is difficult to understand, how remedies of this kind can possibly give rise to a translocation of the disease to the internal organs. Although during the paroxysm, in young vigorous habits, the diet should be of the antiphlogistic kind; yet in the weak or aged, in whom the constitution is much broken down by the disease, such a treatment would be highly improper, and frequently give rise to the atonic gout; nature, on account of the weakness of the system, being incapable of freeing the habit from the morbid matter. In such cases, of course, a generous diet, with a moderate quantity of wine, is to be allowed.

Hitherto we have considered the paroxysm of a regular gout, in which, in reality, little is to be done by medicine; but a more active practice is necessary in the irregular gout. In cases of atonic gout, the ineffectual efforts of nature to get rid of the morbid matter should be supported by blistering the lower extremities, and by taking opiates, camphor, musk, ammonia, and wine internally; from which remedies the desired purpose is frequently obtained. In the retrocedent gout, what I have recommended on the head of retrocession of rheumatism holds likewise good with respect to this disease. If a violent diarrhœa occur, the taking plentifully of weak broths, emollient glysters, and opiates, are the best remedies.

In cases of nausea and vomiting, recourse should be had to opiates, with cataplasms and blisters at the region of the stomach. In the misplaced gout,
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when the morbid matter falls on some internal organ, producing in it inflammation, the treatment proper in an idiopathic inflammation of the same parts should be pursued. In persons liable to irregular gout, issues or setons in the neck or thigh are of great efficacy, in preventing irregular fits, and expelling from the body the morbid matter. If after the paroxysm some swelling and stiffness should be remaining in the joints, these symptoms may gradually be gotten the better of by the use of soap, camphor, and volatile liniment, frequent frictions and moderate exercise.

In the intermission, the physician should make an attempt to prevent the return of the paroxysms, or at least to render them less frequent and more moderate. Cullen is of opinion, that the gout cannot be cured by medicines, but that labour and abstinence will absolutely prevent any returns of it for the remainder of life. Accordingly, he considers moderate exercise, and the living upon a vegetable or milk diet, as the means best calculated to cure the disease. However great the deference I have for the abilities of this justly celebrated physician, I cannot avoid entertaining a different opinion, as to the most powerful means of preventing and curing the gout. That moderate exercise and a simple diet are justly ranked among the chief antidotes against the disease in question, is proved beyond all doubt; there are instances on record of rich men, who had laboured under the gout for several years, and who, having the misfortune of being brought to indigency, were radically cured of the complaint by their being obliged to have
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recourse to bodily labour, and to live upon a simple diet. As nothing proves more efficacious to strengthen the system in general, and the digestive powers in particular, than continual exercise, a moderate simple diet, and a regular manner of living, the happy effects brought about by this change of diet and manner of living are easily to be accounted for. But I hope to be excused for looking upon a simple diet, and a low vegetable one, as two very different things: it is not the use of animal food that occasions the gout; it is the eating and drinking too much: the sufferers by gout we shall find are generally those, who indulge in the luxuries of the table, who continually overload the stomach by the taking of a variety of things at once, and use much more food than their digestive powers are capable of converting into proper nourishment; and who, at the same time, instead of rousing the digestive powers into action by constant exercise, weaken them by a sedentary and inactive life. Indeed a proper quantity of animal food, far from producing the gout, is rather an antidote against it, when used in conjunction with bodily exercise. Farmers, who live a great deal upon animal food of the most difficult digestion, are but rarely sufferers by the gout. In fine, as all remote causes of the disease operate by weakening the system in general, and the digestive powers in particular, it may *a priori* be concluded with certainty, both that a vegetable or milk diet is so far from being able to counteract the morbid stimulus, that such a treatment in general cannot be carried into execution with safety to the patient; and that a moderate use of animal food, by strengthening the general habit, must necessarily prove useful.

ful. This conclusion is completely confirmed by practical experience; since in patients, who have entered upon a vegetable or milk diet only in the decline of life, or whose constitution was much broken down by the disease, the sudden change from a full to a spare diet has often brought on an atonic gout, and death itself has not unfrequently been the consequence of such a treatment. In young vigorous persons, it is true, the pursuing of the plan recommended does not so readily throw the system into an atonic state; yet it has a tendency to debilitate the constitution; the stomach, in particular, is frequently so much weakened by it, as never afterwards to be capable of bearing any solid food; not to mention the disorders of the primæ viæ often produced by a milk diet; as the stomach is usually weak in those, who labour under the gout; and it is well known, that persons of weak digestive organs are generally incapable of bearing a milk diet for any length of time. It is likewise to be observed, that a milk diet extremely predisposes the patient to many diseases, on account of it's weakening the general habit; does nothing more than suspend the action of the disease; and is incapable of bringing about a radical cure: since to prevent the attack of the gout, the diet must be persisted in during life; and, if, after having lived upon milk and vegetables alone for the space of two years, the patient return to his former mode of living, the consequence is, that the disease recurs with increased violence, and in a more irregular and more dangerous form. As thus a milk and vegetable diet proves only a palliative cure for the gout, and predisposes the patient to many diseases, it may justly

be concluded, that the remedy is worse than the disease, for the removal of which it is intended.

Having said so much on the subject, in order to show clearly the insufficiency of a vegetable or milk diet to remove the gout, and the danger attending it's use in respect to the constitution, I shall now enter upon a plan of treatment, which, being founded on accurate observation, both of the symptoms and the remote causes of the disease, I have seen attended with the utmost success in several cases.

As the gout originates from the debility of the system at large, and more especially from the weakness of the chylopoietic organs, during the intermission the general habit should be strengthened, and the digestive powers restored to their due tone; by the use of bark, the preparations of steel, chamomile flowers, gentian, and gum galbanum. During the exhibition of these remedies, care should be taken, to keep the body open without much purging, or weakening the primæ viæ, which is most effectually done by adding to the above remedies rhubarb or aloes. The use of the tonics should be begun with a small dose at first, and after the system becomes accustomed to them, they may be gradually increased; for, if this caution be neglected, and large doses given at once, the tonics will operate on the irritable stomach of the patient as violent stimulants, and, instead of strengthening the constitution, they will often bring on a fresh fit of the gout. Chalybeate or common water should be the ordinary drink; yet a moderate quantity of porter may be
daily

daily allowed with perfect safety, and even with advantage to the patient; but the use of wine and spirituous liquors should be forbidden, for they generally incite the paroxysm of the gout, by stimulating the system too much; except in those cases, in which the patients have been accustomed to the use of strong drink for a considerable length of time; and especially when they are weak, or in the decline of life, for then it is useful, and even necessary, to allow daily a moderate quantity of sherry or madeira wine, in order to prevent the atonic gout by supporting the *vis vitæ*. Though a moderate use of animal food is quite necessary to the radical cure of the gout; yet the diet of the patient ought to be a simple one; he should not take a variety of things at once, and must be careful not to overload his stomach. His manner of living ought to be regular: he should go to bed early, and rise soon in the morning; frequent exercise on horseback, and moderate walking, prove powerful tonics for the digestive organs, and of course should be daily practised.

But though a due attention to the remedies recommended will no doubt render the paroxysms less frequent, and more moderate, yet it is to be acknowledged, that they are but seldom sufficient to prevent entirely the return of the gout during the rest of life: for, as they do not remove the predisposition to the disease, the gout makes it's appearance again, as soon as any of the exciting causes are applied to the body. In conjunction with them, therefore, such remedies are to be exhibited, as more particularly operate on the lymphatic system,

and seem by a specific power to destroy the gouty diathesis of the body. Indeed, though phytic is incapable of curing the gout, except a proper dietetic regimen be employed at the same time, yet regimen will often be found to fail in removing the complaint, without the assistance of medicine.

The remedies, by which such salutary effects are brought about, are gentian, the flores sulphuris, rob sambuci, crude antimony, guaiacum, and the hydrargyrus muriatus especially joined with bark and opium. Their use, however, ought to be suited to the constitution and age of the patient: for as these medicines differ very much as to their stimulating power, it is evident, that an indiscriminate use of them may do a great deal of harm. If the patient be young, vigorous, and of an irritable disposition, the best medicine I am acquainted with to cure the gout is the flores sulphuris from $\mathfrak{Z}i$ to $\mathfrak{Z}ii$ a day, made up in the form of an electuary by the addition of one or two ounces of the rob sambuci. The celebrated archiater of the emperor of Germany, Dr. Quarin*, as far as I know, was the first, who recommended the flores sulphuris combined with the rob sambuci, in this disease; and I have seen them several times used with the utmost benefit to the patient. The rob sambuci seems somewhat to contribute to the success of the medicine; for when sulphur alone has been given, the efficacy of the remedy seems to be weakened; the use of these remedies ought, however, to be continued for several months, in order to answer the desired purpose. If

* *Animad. Praet. in divers. Morb.* cap. xv.

the patient be of a less delicate fibre, or rather more advanced in life, the crude antimony is to be recommended. From this I have experienced twice considerable benefit. Dr. Quarin has generally combined it with the sulphur in these cases. The efficacy of this medicine is likewise testified by the archiater of the king of Denmark, the renowned Dr. Guldbrand, who usually gives it in conjunction with an infusion of the flores sambuci, or joined with asafœtida in the form of pills*. In cases where the patient labours under an acidity of the primæ viæ, magnesia, or some other absorbent, should be given along with the antimony. If the patient be of a flaccid relaxed habit, or liable to the atonic gout, recourse should be had to the guaiacum, either dissolved in spirit of wine, or given in form of pills in conjunction with flowers of sulphur and antimony. Recent cases of the gout I have seen cured by gentian and gum galbanum, given in the form of pills. In cases where the patients are not very irritable, and do not labour under any morbid affection of the breast, the hydrargyrus muria-
tus, combined with bark and opium, is to be recommended. The dose is from a quarter of a grain, to half, and, in a few cases, to three quarters, or even a whole grain in a day. I have seen this remedy exhibited in inveterate gout, where the guaiacum has failed, with the utmost benefit: the patients experienced but very slight returns of the gout; even the chalky concretions of the joints seemed to be gradually absorbed, and the joints became in a great measure restored to their former suppleness

* *Act. Hafniens.* vol. 3, p. 320, & seq.

and strength. Beside these remedies, soap, absorbent earths, and lime-water, have been recommended: but though I do not question the veracity of those gentlemen, who have attempted to establish their credit, yet I cannot help observing, that in all cases, where I have seen these medicines tried, they have invariably proved unsuccessful. The aqua mephitica alkalina, we are told, has lately proved efficacious in preventing the returns of the paroxysms of the gout. The dose is half a pint twice or three times a day. Of this, however, as I have had no experience of it's effects, I can speak neither in favour nor dispraise. The less as it requires to be taken for a great length of time, to obtain the desired purpose; and a long continuance of this remedy does not seem to be perfectly safe, at least for all constitutions, while we have at hand different medicines to cure the gout, which at the same time may be given with perfect safety to the patient.

By using the medicines I have attempted to recommend, in conjunction with tonics, moderate exercise, a simple diet, and regular manner of living, the gout, when not very inveterate, will generally admit of a radical cure in young persons, and the patients will remain free from the disease during the remainder of life; unless they again acquire a gouty disposition, by using an irregular diet and manner of living. And though these remedies, in old people, or in cases of very inveterate gout, will frequently fail in performing a radical cure; yet they will generally render the paroxysms less frequent, and moderate their violence so much, that the constitution will not be injured by them, and the patient

tient may enjoy a pretty healthy state for several years.

If the gout prove mortal; it kills either by dropsy, produced by the weakness of the system, a natural consequence of the frequently repeated paroxysms; or the patients are destroyed by an atonic or misplaced gout: in the latter case they are usually carried off either by an apoplexy, or by an inflammation of the lungs; though sometimes they die under the efforts of nature to bring the morbid matter back again to the joints, that is, amid convulsions.

P A R T III.

OF DEATH

ENSUING WHEN THE ACTION OF ANY VITAL ORGAN IS SUPPRESSED; OR OF THE DEATH, WHICH FOLLOWS THE DISORDERING THE CHAIN OF THE VITAL POWERS FROM THE ACTION OF ONE OR TWO LINKS IN THE MIDDLE BEING DESTROYED.

AS the life of the whole body is, strictly speaking, produced from the concordant vital actions of all the parts of the body, I have observed above, that life may be aptly figured by a chain constructed of many links sustaining one another, in which the chain resembles the vital principle, and the links express the *vita propria* of each organ.

If it be now asked, in how many different ways the chain may be broken, that is, in how many ways man can die; I answer, that either the whole chain may be equally destroyed, or some link may be struck out from the middle of the chain, by which the destruction of the whole chain will be no less certainly accomplished.

In the preceding part I treated of the diseases operating in the first way: I shall here take notice of the diseases acting in the second manner. To these belong all the local diseases, which, though numerous, and very different from each other, may nevertheless, with regard to their manner of killing, be reduced to the five following classes: viz.

Class

- Class viii. Death from Inflammations.
- ix. ——— Fluxes.
 - x. ——— Cachexies.
 - xi. ——— Diseases of the Nervous System.
 - xii. ——— Diseases of the secretory Organs.

Although these diseases mostly put an end to life in the above way, it is not to be denied, but that they sometimes occasion death by the destruction of the vital principle; for when either the afflicted organ is provided with a great number of nerves, or the patient is very irritable, the most violent efforts of the vital powers often arise, and the patients not unfrequently expire under dreadful convulsions; nay, tetanus, which for the sake of order I am obliged to rank among the diseases occasioning death from the vitiated function of the nervous system, when fatal, almost always operates by destroying the vital principle: such cases, however, which happen but seldom, are to be considered as exceptions to the general rule. In fine, when I assert, that the local diseases take away life by the destruction of one or two organs, I do not maintain, that the other organs are not affected by the morbid stimulus; but I mean only, that the other organs suffer merely by sympathy, or that, at the utmost, the noxious power is sometimes secondarily communicated to some of them.

C L A S S VIII.

DEATH FROM INFLAMMATIONS.

When by any cause the *vis vitæ* of the sanguiferous system is incited to such a degree, that tumour, redness, heat, and pain, are produced, whether this incitement of the sanguiferous system be real or spurious, the morbid condition is named an inflammation: if the whole of the sanguiferous system be incited in this determined way, an universal inflammation, or an inflammatory fever ensues; whereas, if the action of the sanguiferous system be incited only in some particular part, a local inflammation is produced: the former, however, is mostly attended with the latter; as the latter, also, not unfrequently changes into the former. This definition of an inflammation seems to me to agree better with the phenomena of nature, than that of the illustrious Hufeland, according to which the incitement of the *vita propria* of the blood is also requisite to it, so that a buffy coat (*crusta phlogistica*) must always be generated on it*: for if such a condition of the blood were a characteristic mark of inflammation, no inflammation could ever happen without it, and, *vice versa*, this condition would also never be observed without an inflammation. Now the contrary is asserted by the most eminent practitioners. Van Swieten relates, “ that he has

* Hufeland. l. 1, sect. 3, kapitel v, p. 303.

“ observed

“ observed such a buffy coat in the soundest men,
 “ who are accustomed to get themselves bled every
 “ year in the spring:” and he observes, that “ it
 “ was always found in a weak man, who was bled
 “ every three months to prevent an hæmoptoe,
 “ under which he had before laboured: thus such a
 “ state of the blood may exist, though there be not
 “ the least inflammation; and, on the contrary, no
 “ buffy coat can sometimes be found even in the
 “ most violent inflammatory diseases*.” The im-
 mortal Sydenham remarks, that the existence or
 non-existence of such a buffy coat depends in a great
 measure upon the manner in which the blood is-
 sues from the vein: “ thus, if the blood do not
 “ spout out from the vein in a horizontal direction,
 “ but trickle down the skin perpendicularly, even
 “ though it may flow pretty quickly, it frequently
 “ will not exhibit the buffy coat †.” Lastly, the
 illustrious Selle speaks thus on the subject: “ As
 “ the inflammatory condition of the blood (at least
 “ that, which evidently appears) is rather to be
 “ considered as an effect of the fever, so perhaps
 “ there is something else requisite to the existence
 “ of an inflammation, that is not in the buffy coat:
 “ for often, either no inflammatory state of the
 “ blood is found; or it sometimes appears only,
 “ when the inflammation has already existed some
 “ time; and in fine, it not unfrequently happens,
 “ that the blood, though before inflammatory, now
 “ appears dissolved, without the least diminution of
 “ the inflammation ‡.” In the spurious inflam-

* L. 1, t. i, *Aphoris.* 384, 652. † L. 1, sect. 3, cap. vi, p. 264.

‡ L. 1, p. 114.

mations, called, though inaccurately, *eryspelatous*, by some moderns, the buffy coat is for the most part not to be observed; yet it would be absurd to exclude these from the class of inflammations; for internal inflammations are often of this kind; and there are even viscera, which scarcely ever labour under a true phlegmonic inflammation. I shall not observe in addition to this, that such a state of the blood is only the effect of a peculiar manner of acting of the vessels on the blood, as what has been said already proves beyond all doubt, that the opinion of Hufeland is contrary to actual observations of nature.

Let it not be argued, that in this way inflammation is confounded with fever: for, though I readily agree, that the incitement of the *vis vitæ* of the sanguiferous system is also requisite to a fever, nevertheless the one differs from the other in it's degree, as, *ceteris paribus*, a greater incitement of the *vis vitæ* of the sanguiferous system is requisite to an inflammation, than to a fever: *ceteris paribus*, I say, since a slight inflammation is often found without any remarkable fever. The degree of incitement necessary to an inflammation cannot well be determined, as it must greatly differ in different subjects, and even in the same person, according to various circumstances, because the stimuli are only relative with regard to the subject, on which they operate, and of course the same degree of incitement will produce in one subject a fever, in another an inflammation, and in a third person both. It is however by no means requisite to an inflammation, that the above symptoms be always observed, as in the inflammations.

inflammations of the viscera, especially when arising in subjects of a bad constitution, they are often either partly or wholly wanting.

The causes of inflammation may be reduced to two principal ones *, viz. “ An inflammation arises
 “ either from the weakness of the capillary vessels,
 “ which renders them unable to resist the usual
 “ impulse of the blood; or from a violent impulse,
 “ when the usual resistance of the capillary arteries
 “ is incapable of sustaining the force with which
 “ the blood is propelled by the heart, and the principal blood-vessels.” To the former belong the inflammations, which arise in putrid, and in other malignant fevers; those, that owe their origin to cold, contusions, fractures, or herniæ; in a word, all those which are commonly called passive or spurious: as on the contrary, all the acute, real, or active inflammations, arise from the latter. The inflammation is sometimes produced from both these causes together: for instance, a severe contusion will occasion a spurious inflammation; but in a vigorous man, such a contusion soon brings on a fever, the whole sanguiferous system partaking of the shock, and the blood is impelled with the utmost velocity through the body; thus both the causes of inflammation concur together, and the inflammation is, in such a case, as it were, compounded of a real inflammation, and a spurious one. Inflammation terminates in seven different ways: viz. *resolution, suppuration, gangrene, induration, secretion of coagulable lymph, transudation through the inflamed*

* Dr. De Leon *Inflammatione*, p. 16.

vessels, and a rupture of them. I shall not speak of the first three, which are admitted by every one: when I come to treat of the event of internal inflammations, I shall mention the last three, which are often fatal: and in the mean time, I shall say a few words on induration. Some moderns have denied this termination of inflammation*; but when I consider, that an induration frequently remains after a boil not having properly suppurated†; that the same often takes place in the inflammation of the lungs, and that even the origin of a consumption ought sometimes to be ascribed to this source, namely, to the indurated vessels becoming successively inflamed‡; I cannot but rank induration among the modes in which inflammation terminates: for, why should it be denied but that, what is frequently observed on the external parts, and what sometimes happens in the lungs, may also sometimes take place in the other viscera, still more exposed to chronical inflammations? therefore induration ought not only to be enumerated among the events of inflammation; but it is one of the most frequent, especially in the venous inflammation of the liver. Now whether such indurations may be called *scirrhus* seems to be a different question, but of this, being entirely foreign to my design, I can take no notice.

Having thus premised a general view of inflammations, I shall proceed to treat of such as are seated

* Cullen, l. 1, vol. i, book iv, p. 238.

† Richter *Anfangsgrunde der Wundarzneykunst*, i band, kapitel vii, § 237 and 241.

‡ Stoll, *Rat. Med.* part i, p, 73, and the following.

internally. I have changed the indeterminate and vague appellations of phrenitis and paraphrenitis, for those of encephalitis and diaphragmatitis; for a constant delirium frequently occurs in continual fevers, without any inflammation of the brain, from a morbid matter adhering either at the orifice of the stomach, or in the abdominal viscera*; whereas many instances of inflammations of the brain without the above symptoms are on record†. The same may be said of the inflammation of the diaphragm, which is often observed without the spasmus cynicus and delirium‡; as, on the contrary, the illustrious Quarin has proved by a great number of instances, that these symptoms also very often occur without the least inflammation of the diaphragm§.

In fine, I do not particularly take notice of the iliac passion; since, though it mostly terminates fatally, it nevertheless always produces an inflammation of the intestines, and kills in this way alone: accordingly, Dr. Simson, who had an opportunity of dissecting many subjects carried off by the iliac passion, always found in them the intestines very much inflamed||; and Dr. Quarin has invariably observed the same phenomena in a great number of persons destroyed

* Stöhl, *Rat. Medend.* part 3, sect. 3, de *Causa et Sede Phrenitidis*, p. 100.

† Quarin, l. i. cap. xiv, p. 210.

‡ Morgagni de *Sedibus et Causis Morborum*, cum *Prefatione* Tissoti, t. iii, lib. iv, epist. 53, art. 3, 5, et 41.

§ L. i. cap. 18, p. 338.

|| *Medical Essays and Observat.* vol. v, part ii, art. 57, p. 154.

by this disease *. I shall not separately treat of all the internal inflammations, because the great analogy they bear to each other renders a general account of them quite sufficient; and in this I shall proceed after the following manner: First I shall inquire, what symptoms always attend the phlegmonic internal inflammations: secondly, how far the erythematic agree with the phlegmonic, and how far they differ from them. These questions being resolved, I shall examine, in the third place, by what causes death is produced in the inflammations of the viscera: and in the fourth place I shall add, in how many ways they may destroy life.

As to the first: It is very difficult to assign certain characters to the phlegmonic internal inflammations, since there are scarcely any symptoms, which may not be wanting. The following alone, therefore, can be considered as essential characters of the phlegmonic inflammation, in whatever *viscus* it may appear: fever; local pain or anxiety; increased heat; a hard contracted pulse, except in the peripneumony, in which disorder a soft pulse often occurs; difficult respiration in the inflammations of the thoracic viscera; in those of the abdomen, often a vomiting; the disorder proceeds quickly, and it's change into gangrene is but a rare occurrence; these alone are the symptoms, which almost always accompany a genuine phlegmonic inflammation of any internal part, and which, therefore, ought to be attended to as essential characters of the disease. It is true, that Haller †, de Haen ‡, Morgagni §, and

* L. I, cap. xxiii, p. 184. † *Opusc. Pathol. obs.* 14, histor. 3.

‡ *Rat. Med.* vol. ii, pt. ii, p. 11.

§ L. I, t. iii, lib. iv, epist. 49. art. 14.

Stoll*, mention cases of inflammations of the stomach without the least pain or vomiting; and that the last also relates a case of enteritis, attended with scarcely any fever, and a very slight pain†; but upon an accurate inquiry into these cases it will evidently appear, that they belonged to the erythematic inflammations, and thus can by no means be taken into account here, where I speak only of the phlegmonic inflammations. Though these observations are of weight with respect to the erythematic inflammations; and are confirmed by Cullen, who relates, that he had often found the abovementioned parts greatly inflamed in the bodies of patients who died of a putrid fever, though no marks of inflammation had appeared during life‡. The reason why the phlegmonic inflammations do not so often terminate in gangrene as the erythematic ones, seems partly to be owing to this, that a severe phlegmonic inflammation not unfrequently kills the patient before a gangrene can take place, but especially from a greater tendency to mortification with which the erythematic inflammations are attended.

With regard to *the second*: As often as a local excitement of the *vis vitæ* in any part of the sanguiferous system is produced, by any stimulus, either in a subject of a bad constitution, or in one already enfeebled by previous disease, an erythematic inflammation is generated.

* *Rat. Med.* pt. i, sect. viii, p. 125 & 126.

† *L. l.* sect. ix, p. 166 & 167.

‡ *L. l.* vol. i, book iv, chap. viii, p. 360.

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Although thus the torpor of the *vis vitæ* in the capillary vessels is the remote cause of the erythematic inflammation; and for this reason it often soon terminates in mortification, because the previously weakened *vis vitæ* of the vessels is farther debilitated even by this excitement; nevertheless, a real excitement in the inflamed part always takes place in such cases. This is proved, not only by the erysipelas; a species of erythematic inflammation, in which, though in a different manner from the phlegmonic, the general effects of inflammation, that is, heat, redness, pain, and tumour, are observed; but, besides, by the nature of inflammation itself, which, from whatever cause it may arise, always requires a certain, and determined excitement of the *vis vitæ*. Therefore, though the erythematic inflammations often run into gangrene so quickly, that not the least marks of excitement in the inflamed part can be observed, it may notwithstanding be concluded, that an excitement has really existed; but, as the degree of excitement necessary to produce an inflammation is not to be determined, and greatly differs even in the same subject, according to the difference of circumstances, this excitement may sometimes exist in such a slight degree, and so quickly pass over, as not to be observable. Thus oftentimes none of the above phenomena can be observed in the erythematic inflammations of the viscera; for the morbid matter is often so pernicious, that the *vita propria* of the inflamed organ is either, as it were, destroyed by a single shock, or so enfeebled, that it's reaction does not sensibly appear: whereas, if the noxious stimulus be less malignant, it does not operate violently, but secretly.

cretely, and thus brings on death by degrees. Hence erythematic inflammations of the viscera are often not discovered till after death.

From this source may also be explained the reason, why ichor is always fecerned instead of a mild purulent matter in this kind of inflammations, when terminating in a suppuration; because the degree of energy requisite to a good suppuration is always wanting in these cases. But it is to be regretted, that such inflammations, though difficult to be discovered, nevertheless much more frequently occur, than the phlegmonic ones: as Cullen justly remarks, that the inflammation of the stomach is almost always an erythematic one*; Stoll asserts the same of the inflammation of the intestines†; and Vogel not only agrees with them, but besides observes, that the inflammations of the bladder and the womb, and also, in temperate climates, those of the liver and of the spleen, are seldom truly phlegmonous‡.

With respect to the cure. In the phlegmonous inflammations bleeding and the strict antiphlogistic treatment are to be pursued; and it ought to be observed, that, in these cases, to draw blood from fourteen to twenty-four ounces at once, and from a large orifice, answers the purpose much better than the loss of the same, and even of a much greater

* L. l. vol. i, book ii, chap. viii, p. 366.

† Cf. *Aphoris de cogn. et curand. Febr.*

‡ L. l. t. iv, kapitel, p. 282, kapitel xiii, p. 300, kap. xix, p. 354, kap. xx, p. 384, kap. xxii, p. 409 & xxiii, p. 422.

quantity of blood, at several intervals. Blisters are likewise very useful, especially when applied to the affected part, in order to remove local pain and congestion.

But for the cure of the erythematic inflammations, which may arise from quite different morbid stimuli, no certain rules can be laid down. The resolution of such inflammations ought, by no means, always to be attempted by the antiphlogistic plan; but the mode of treatment should differ in them according to the morbid cause, the difference of the subject, and the various circumstances that accompany them. Indeed they are so far from always requiring an antiphlogistic mode of treatment, that, on the contrary, tonics not unfrequently perform the whole cure, so that nothing certain can be determined with regard to them, but different remedies ought to be employed according to circumstances.

From what has been said it is easy to be understood, in how far the erythematic inflammations agree with the phlegmonous, and in how they differ from them: for they agree thus far, that a local excitement of the active life of the vessels takes place in both: they differ in as much as the excitement of the *vis vitæ* of the vessels in the erythematic is by no means the effect of their increased energy, but only of some morbid stimulus; and that the torpor of the vital principle not unfrequently accompanies this particular excitement.

As to the third: The causes, from which the danger of an inflammation, whether phlegmonous, or erythematic, arises, may be reduced to the six following: 1, the reigning epidemic: 2, the cause of the inflammation: 3, it's degree: 4, the importance and structure of the organs inflamed: 5, the age, sex, and constitution of the patient: 6, the previous state of the patient's health: which I shall here severally investigate.

1, The first among the causes, which render inflammation fatal, is the reigning epidemic; as the nature, cure, and danger, of the inflammation, often depend upon this alone. Thus Sydenham relates, that the pleurisy, and peripneumony, which were epidemic at London in the year 1675, were of such a mild nature, that all the symptoms gradually disappeared on proper treatment*: whereas Burserius mentions a very fatal epidemic fore-throat, called gangrenous, on account of it's propensity to mortification†. Though in a phlegmonous pleurisy blood must be copiously drawn, nevertheless in general the flux of blood is to be stopped at the first appearance of fainting, that a mortal peripneumony may not succeed to the pleurisy: yet the learned Dr. Cleghorn observed an epidemic pleurisy, in which he had recourse with the utmost success to such a bleeding, as scarcely any one could undergo without fainting; for this physician drew about four pounds of blood within the space of twenty-four hours, and, the symptoms

* L. 1. sect. v, p. 245.

† L. 1. t. iii, cap. xvii, p. 368.

not being diminished before the fourth day of the disease, he again extracted the same quantity in the same space of time*. The chev. Brambilla described an epidemic inflammation of the lungs, which seldom attacked persons either of a weak constitution, or of an advanced age, and when it did was of a mild kind; whereas it almost always proved fatal to young men, though repeated bleeding, and the rest of the antiphlogistic treatment was prescribed, till at length recourse was had to a copious bleeding by way of preventive, in consequence of which most of them remained free from the disorder†. Fothergill, on the contrary, has observed the worst effects from phlebotomy in an epidemic sore-throat‡. These instances prove how much the reigning epidemic is to be regarded both in the prognosis and cure of inflammation.

2, The causes of inflammation are justly enumerated among the principal sources, from which it's prognosis and treatment are to be derived; as the event of an inflammation frequently depends upon the greater or less importance of it's cause, and the facility, or difficulty, with which this can be removed. The immortal Boerhaave, speaking of the prognosis of encephalitis, declares it to be mortal, when brought on by a peripneumony, or by the iliac passion, and very dangerous when produced by the small pox§. Quarin remarks, that a

* L. 1. chap. vi, p. 267.

† L. 1. t. i, p. 409.

‡ *Account of a putrid Sore-throat*, p. 41.

§ *Aphorism de cogn. et curand. Morb.* p. 174.

violent pleurisy, or a peripneumony, happening after a fore-throat, is scarcely curable*. Van Swieten asserts the same of an inflammation of the liver arising from a fore-throat†. In fine, the learned Dr. Eller observes, that, *vice versa*, a fore-throat is dangerous when occasioned either by a previous epidemic dysentery, or by the confluent small pox; and fatal, if produced either by an inflammation of the lungs, or by a malignant catarrhal fever‡. The famous physician de la Mettrie fatally experienced, how much attention ought to be paid to the cause of the inflammation of any *viscus*. He contracted an inflammation of the stomach by eating a very large quantity of venison, that was but slightly dressed. Neglecting the cause of his disease, he attempted to vanquish it by repeated and copious bleedings alone, but with such ill success, that, the vital principle being extremely weakened, by the repeated bleedings, at length a gangrene succeeded to the inflammation, by which he was carried off on the fourteenth day of the disease§.

3. The degree of the inflammation is by no means to be omitted among the causes, which sometimes render it fatal; for it may be so violent, as to bid defiance to all medicine. Thus, for instance, ac-

* L. l. cap. xvii, p. 296.

† L. l. t. ii. § 809, p. 679.

‡ *Observ. de cogn. et curand. Morb. præsert. acutis. sect. vii.* p. 175.

§ Eller l. l. sect. xi, p. 251.

according to the observations of Sydenham, the inflammation of the windpipe sometimes kills within a few hours *. Stoll mentions a case of a taylor, whose lungs were so violently inflamed, that, notwithstanding copious and repeated bleedings, he was destroyed by a suffocation on the seventeenth day of the distemper †. A phlegmonous inflammation of the brain, on account of it's violence, seldom lasts beyond the seventh day, but generally ends in death on the third, or fifth ‡; and Prosper Alpinus relates, that it has proved mortal in three or four hours §.

4, The parts inflamed are also to be considered in the prognosis of an inflammation; because it is more or less dangerous, according to the various structure of the inflamed organ; to it's different situation, both in respect to the other parts, and to the more easy or difficult application of remedies; and finally, to the different function to which the injured organ is destined. Hence the inflammation of the heart is usually mortal: and the cure of a peripneumony is difficult, as well on account of the perpetual motion of the lungs, and the very tender structure of the vessels, which are easily destroyed, as because topical remedies cannot so effectually operate on it ||. Boerhaave remarks, that an inflammation of the stomach soon proves fatal, on account of the vitiation of a necessary function, and it's sym-

* L. 1. sect. 6, p. 282.

† L. 1. pt. i, sect. 14, p. 150.

‡ Quarin. l. 1. cap. 14, p. 214.

§ *De Medicina Ægyptiorum*, p. 50.

|| Quarin, l. 1. cap. 17, p. 294.,

pathy with the rest of the body *; to which causes may farther be added, that the requisite medicines cannot properly be taken in, on account of the continual vomiting. An inflammation of the diaphragm is in general more dangerous than the pleurisy, both on account of the perpetual motion of the diaphragm, and of it's consent with the heart and brain †. In fine, an inflammation of the womb, *ceteris paribus*, is observed to be more fatal than inflammations of the other viscera; since it is most of all inclined to suppuration and gangrene, and frequently terminates in a mortal consumption ‡.

5, The age, sex, and constitution of the patient are by no means to be neglected. Thus even Hippocrates remarks, that, inflammations of the thorax more severely afflict strong and robust men, than those, who live without exercise §. Hence, *ceteris paribus*, any inflammation is much easier cured in women and young men, than in strong and laborious persons, on account of the greater mobility of their fibres, and the inferiour density of their fluids ||. In fine, for this reason, as is proved by Dr. Home, men generally labour under the encephalitis in a more severe degree, than women ¶.

6, Finally, great attention ought to be paid to the state of the patient: for it is well known, that wo-

* L. 1, § 952, p. 228.

† Quarin. l. 1, cap. 18, p. 339.

‡ Vogel, l. 1, t. iv, kapitel 23, p. 422.

§ *Coacæ Prænotiones*, sect. ii, p. 181.

|| Quarin, l. 1, cap. 13, p. 193. ¶ *Principia Medicinæ*, p. 103.

men with child and lying-in are more severely affected, and less easily restored, in acute diseases, than other subjects; and that the hump-backed, or those who have a narrow chest, often labour under inflammations of the breast. The same is seen in men of a delicate and tender fibre, as an incurable phthisis mostly succeeds to the peripneumony in such subjects, especially if they have besides an hereditary predisposition to the consumption. The slightest inflammation, though proceeding from an external cause, mostly terminates in an ill looking ulcer in those who labour either under the scurvy, or under any other cachectic disease. Quarin asserts, that a peripneumony happening to the phthisical proves commonly fatal, and that, when succeeding to a dropsy of the chest, or, *vice versa*, when such a dropsy happens after the peripneumony, the disease is absolutely mortal *. There are, notwithstanding, some exceptions to this rule; as, according to the observations of the renowned physician Zimmermann, some who had been attacked by peripneumony when labouring under the dropsy of the chest, and, on the contrary, others, who had fallen into a dropsy of the chest after an inflammation of the lungs, were recovered by a proper method of treatment †.

In the fourth place, I have at length to explain, in how many ways the inflammation of any *viscus* may become fatal. On considering this subject, it seems to me, that an inflammation can kill in ten different

* L. 1, cap. 17, p. 296.

† *Von der Erfahrung in der Arzneykunst*, theil i, lib. 3, kapitel 6, p. 363.

ways: 1, by convulsions; 2, by an apoplexy; 3, by suffocation; 4, by secretion of coagulable lymph; 5, by metastasis; 6, by gangrene; 7, by transfusion; 8, by rupture of the vessels; 9, by an imposthume in the cavity either of the thorax or of the abdomen; 10, by effusion of the gall in the abdomen.

1, Death by convulsions happens in the commencement of an inflammation. Such an event owes its origin either to the too irritable state of the patient, or to the irritability of the organs affected: for which reason this termination chiefly takes place in the inflammation of the brain, the stomach, and the intestines*. How death is induced by convulsions has been often enough explained above.

2, The patient is carried off by an apoplexy, either when the blood is retained in the brain, on account of the spasmodic contraction of the vessels; when the reflux of the blood from the brain is impeded by the swelling of the inflamed organ; or, in fine, when the brain suffers such a compression from secreted coagulable lymph, that a mortal apoplectic fit instantaneously ensues.

3, Death from suffocation may be occasioned, either by the inflammation of the *glottis* and the *epiglottis*, by which the opening of the *glottis* is closed; by the secretion of coagulable lymph filling up the whole windpipe, and thus blocking up the free passage of the air to the lungs; or, in fine, by an

* Van Swieten, l. l. t. iii, § 953: Stoll *Aphorif.* § 311: and Vogel, l. l, t. iv, cap. 1, p. 14.

impofthume enfuing from a fore-throat, which tumour either impedes the accefs of air by it's bulk; or the rupture of it puts, as it were, in one moment an end to life by the abundance of purulent matter difcharged.

4. The fecretion of coagulable lymph is one of the moft frequent confequences of inflammations: indeed, that this fecretion often happens, is proved by the frequent adhesions of the pleura to the lungs; of the pericardium to the heart itfelf; of the liver to different parts of the abdomen; of the omentum to the ftomach; and by a membrane, two lines in thicknefs, obferved by Dr. Burnftiel between the dura mater and the brain, in a perfon to whom an inflammation of the brain had proved fatal*: all which ought to be looked upon as fo many membranes, produced by the fecretion of coagulable lymph. This fecretion of coagulable lymph is not always ominous, but terminates differently, according to the different organs affected. Thus in the pleurify the difeafe is often luckily cured by this fecretion, and the patient afterwards experiences no detriment from the adhefion of the parts. The inflammation of the abdominal viscera indeed often terminates in a like way; but here it not unfrequently leaves troublefome fymptoms behind it in confequence of the adhesions of the viscera to each other. Laftly, if this fecretion of lymph take place in a large quantity, in an inflammation of the brain, or of the lungs, life is deftroyed: in the firft cafe, either by an apoplexy, or a fphacelus of

* Burfarius, l. 1, vol. 3, p. 402: Vogel, iv theil, p. 14, und.
148.

the brain, produced by it's compression; and in the second, by suffocation. Thus it appears, that this consequence of inflammation ought to be considered as a salutary effort of the vital principle to vanquish the disease; though this effort is sometimes followed by an unfortunate, and even mortal event.

5, The patient dies from a *metastasis*, either when the morbid matter is of so pernicious a nature, that a sphacelus of the afflicted organ is directly produced; because the vital principle, already weakened, is unable to sustain a new inflammation: or, when the noxious matter is transferred to organs, the structure of which may be readily destroyed, and the function of which is absolutely requisite to life. The cause of death differs according to the different *viscus* to which the *metastasis* takes place.

6, I shall here say nothing of death from gangrene, having often spoken above of it's manner of killing, and, in the sequel, I shall treat particularly of mortification and it's causes.

7, Transudation from the vessels is justly ranked by the great Cullen among the events of inflammation*; since dissections prove, that it happens much more frequently than is commonly believed. This transudation of the serum either arises in the last stage of the disease, when an universal relaxation of all the powers succeeding to the inflammation, the serum, as it were, sweats through the gaping interstices of the relaxed vessels, in which case this effu-

* L. I, vol. i, book ii, chap. 16, p. 240.

sion of serum takes place in a great quantity *; or it is occasioned by a violent degree of inflammation, when a salutary effort of nature cures the disease, by producing this effusion of serum †; or, lastly, when, without the least inflammation, the vessels, grown too turgid from plethora alone, lose their tone, their coats, too much distended by the blood, recede from mutual contact, and thus the serum is discharged ‡. This event of inflammation, when arising from an universal relaxation of all the powers, is almost always mortal §; whereas, when occasioned by the too great distension of the vessels, it seldom brings on death, but mostly changes either into dropsy of the chest, or into ascites ||. The cause of death is different, according to the difference of the organs in which the transudation takes place.

8, The inflammation is sometimes terminated by a diæresis, or rupture of the vessels, which is chiefly produced by two causes. It happens in the first place, when the vessels are broken by the violent pressure of the column of blood, on account of their being in the highest state of inflammation. Such a rupture chiefly takes place in the inflammations of the lungs, on account of the delicate structure of their vessels; though, I do not deny, but that it may also sometimes happen in the inflammations of the other vis-

* Stoll, *Rat. Med.* pt. i, *sect.* 13, p. 148.

† Stoll, l. l. pt. i, p. 95 and 98.

‡ Stoll, l. l. pt. 3, cap. vi, p. 203.

§ Stoll, l. l. and Cullen, l. l. vol. i, book ii, p. 240.

|| Stoll, l. l. pt. 1, *sect.* ix, p. 128; Cullen, l. l. p. 241, and Morgagni, l. l. t. iii, lib. iv, *epist.* 211, art. xxxiv.

cera. The blood, in this case, is effused either into the wind-pipe, in which case a hemoptoe ensues. Dr. Eller has observed such a termination of peripneumony in a vigorous young man; who nevertheless was restored to perfect health in three months*; or it is diffused in the cells of the lungs, in which case a suffocation is produced by the compression of the lungs, and the impediment of their function. Haller confirms this by two examples†, and Cullen is of opinion, that this effusion of blood chiefly constitutes the cause of death in those who die from an inflammation of the lungs‡. It occurs in the second place, when the tone of the vessels is greatly weakened; which may happen from different causes. Haller records such a case of a lying-in woman, whose death seemed to have been occasioned by an erysipelas of the calf of the leg, but appeared to him, on the dissection of the body, to have been the consequence of an inflammation of the intestines, and especially of an effusion of blood into the cellular membrane through the whole length of the intestines§. The effusion of blood from this cause is almost always fatal.

But though it seems probable from this observation, that a rupture of the vessels may sometimes take place from this cause, yet I cannot help observing upon this occasion, that it has appeared to my worthy preceptor, the celebrated professor Brugmans, from a great number of observations

* L. l. sect. vii, p. 196 and 197.

† *Opusc. pathol. obs.* 14, hist. 1 and 2, p. 29 and seq.

‡ L. l. p. 239.

§ L. l. *obs.* 83, p. 109 and 110.

made upon such bodies, both of men and animals, that a diæresis of the vessels from this source much more seldom exists, than is commonly believed. Repeated experiments taught him, that when, at the first appearance, the colour and the internal surface of the alimentary canal seemed to indicate, that blood had been effused by diæresis, a rupture of the vessels nevertheless had not taken place, but that the minute blood vessels of the intestines were then only turgid with this fluid, so that they broke after death, on the application of a very slight force*.

9, An imposthume in the cavity, either of the thorax or the abdomen, belongs to the manner of dying from inflammation only when the abscess is so large, that, on it's breaking, all the viscera of the thorax or the abdomen are weltering, as it were, in the purulent matter. In the first case, the patient is carried off by a suffocation: in the second, the cause of death differs, according to the different *viscus*. In general, such an imposthume being broken, there ensue faintings, great relaxation of the powers, *meteorism*, and a gangrene, which extinguishes life; though the patients do not always die in the above manner, but sometimes in a quite different way, and which is only explicable by the dissection of the body, of which Dr. Macbride relates a striking instance. A vigorous middle aged man became unawares attacked with a total suppression of urine, and died in three days; the body being opened, no mark either of the stone or gravel appeared in the kidneys or the bladder; but all the

* *Rapport wegen den Staat der Veeziekte*, p. 20.

viscera of the abdomen were found weltering in purulent matter, which had flowed out of the spleen, the greater part of which was consumed, and by the acrimony of which the bladder was very much contracted*.

10. In fine, when the liver, especially it's concave part, is attacked by an inflammation, it is also not unfrequently communicated to the gall-bladder. If such an inflammation terminate in a suppuration, the bile itself, together with the purulent matter, is often effused into the abdomen, and then the patients almost always die of sphacelus of the intestines. In this case, a relaxation of all the powers, fainting, and meteorism are the forerunners of approaching resolution†.

* L. l. Vol. ii, book ii, chapter vii, p. 182.

†. L. l. t. iv, chapter 19, § 30.

C L A S S IX.

DEATH FROM FLUXES.

O R D E R I.

The Fluxes of the Belly.

G E N U S I.

Diarrhœa.

DIARRHŒA is a frequent, copious, and liquid discharge of the contents of the intestines. It is easy to perceive from this definition, by what marks the diarrhœa ought to be distinguished from dysentery, with which it is often confounded: for in the diarrhœa the flux is always observed to be copious; whereas, in the dysentery, though the patient makes very frequent and painful efforts, they are almost ineffectual, so that, the *feces* being retained, nothing is discharged except a little blood, and *mucus*, or *mucus* alone. This alone is the pathognomonic sign, by which both these diseases, when not combined together, may always be distinguished: for it does not belong to the nature of the diarrhœa, that, as is commonly believed, griping pains should be entirely wanting; since these may not only exist in a diarrhœa, according to daily experience, but sometimes this disorder is accompanied with a very violent pain. For instance, in the bilious fever, the
bile

bile is not unfrequently found so acrid as to excite frequent, copious, and griping stools, whence even an erythematic inflammation of the intestines often arises.

All the different species of diarrhœa may, in my humble opinion, be readily reduced either to diarrhœas arising from some acrid stimulus, to habitual ones, or to colliquative fluxes; and I am the more inclined to this division of diarrhœa, as the cure of the different species is already in some measure obvious from it. For, if the looseness arise from a morbid stimulus, we ought always to endeavour at the removal, or at least, the abatement of the stimulating power, by diluents, demulcents, opiates, and the occasional exhibition of neutral salts, and other gentle purgatives. In the second kind, we should succour the weak and irritable alimentary canal by means of tonics, astringents, and anodynes, of which the simaruba, cascarilla, logwood, gum kino, alum, catechu, bark, rhubarb, and opiates, are the chief. Emetics likewise may be advantageously used, as vomiting produces some inversion of the peristaltic motion. In the colliquative fluxes the disease is for the most part above the power of physic, because such diarrhœas, as are effects of a greater or less degeneration of the structure of the intestines, mostly prove mortal; and a palliative treatment, by the remedies we have recommended for the habitual diarrhœa, is all, in general, that can be expected from the physician.

Diarrhœa kills in three ways; by a fainting, an inflammation of the intestines, and a colliquative flux.

In the first case the vital powers, on account of the very copious and frequent stools, become so weakened, that at length the heart itself, overwhelmed with blood, and unable to propel it, falls into a mortal fainting. I have already shown how the inflammation of the intestines, and the colliquative flux, bring on death.

GENUS II.

Dysentery.

A DYSENTERY is a frequent, small and painful discharge of the belly, attended with tenesmus. It may be either mucous, or bloody; and is mostly attended with some degree of pyrexia.

As the dysentery is a disorder, which is not only frequently met with in private practice, but more especially prevails in armies, where it often proves one of the most destructive enemies of which the british army on the continent, under the command of His Royal Highness the Duke of York, in 1794, was a remarkable instance, I intend to treat a little more fully of this disease. I shall speak therefore, 1, of the nature of the dysentery; 2, of it's seat; 3, of it's complications; 4, of it's cure; 5, how *opium* remedies the dysentery; 6, of it's contagion; 7, of it's prevention; and 8, of it's manner of killing.

As to the first. I look upon the simple dysentery as a catarrh of the intestines, which is produced in two ways: either the catarrhal matter is secreted by the specifically affected vessels of the intestinal coats; or, when already generated in another part of the body, it is translated to the coats of the intestines.

The reasons, why following the footsteps of Stoll and Richter, I consider the genuine or simple dysentery as a catarrh of the intestines, are principally the following.

1, The dysentery scarcely ever appears except in that season of the year, in which catarrhal affections are most prevalent, which seems to show, that there exists a great affinity between these diseases.

2, Catarrhal affections very often precede the dysentery, which, on its arising, immediately disappears; as not only the illustrious Richter has demonstrated by many instances*, but also Dr. Stoll has frequently observed, that the rheumatisms of the extremities are instantaneously removed, on the arising of a dysentery†. Besides, it is proved from the dissertation of the celebrated sir George Baker, that the catarrh, which was epidemic in England, in the year 1762, changed in the commencement of the autumn, into dysentery, which, considering the different seat of the disease, and the different function of the affected parts, was perfectly

* L. I. kapitel, p. 87.

† L. I. p. 187.

of the same nature *, an unequivocal proof, that the morbid state was not in the least different in the two diseases.

3, On the other hand, catarrhal affections of the other parts arising, the dysentery quickly ceases. Richter relates, that a dysentery was removed by a supervening fore-throat †, and Stoll has often witnessed, that it disappeared on the arising of rheumatic pains in the extremities ‡.

4, Stoll remarks, that at the same time of the year both these diseases are equally frequent, so that some are attacked with the rheumatism, and others with the dysentery §; which manifestly proves, that these morbid affections are produced from one and the same noxious power, and that they differ only by attacking different parts in different subjects.

5, Sydenham calls the dysentery, “ the fever of the season turned in upon the bowels ||,” on account of the sensible diminution of the fever upon the appearance of this distemper. Sir John Pringle says, “ frequently, the beginning of a flux will have the appearance of the autumnal fever; for the patient will be feverish with a disorder in his stomach and bowels, for two or three days before the purging comes on; but after that the fever sensibly gives way. At other times, upon fatigue,

* See *Sandifort Thesaur. Dissert.* t. ii, p. 365 and seq.

† L. l. p. 89.

‡ L. l. p. 187 and 201.

§ L. l.

|| Febrem eum esse (sui 'cilicet generis) in intestina introversam deprehendi, l. l, de *Morb. acut.* sect. iv, cap. iii, p. 182.

“and exposition to cold, during the dysenteric season, the men will be more suddenly seized with the flux; but seldom without some degree of fever*.” All which observations leave not the least doubt, but that the dysentery is a catarrhal affection of the bowels.

6, If, in fine, I add to all this, that the dysentery, as to it's symptoms, those alone excepted, which immediately depend upon the affected part, and also as to it's complications, perfectly agrees with the other catarrhal disorders, I have not the least doubt, but that the dysentery belongs to them.

As to the second. This catarrhal matter principally affects the smaller intestines, and produces in them a spurious inflammation, often running into gangrene, which, if not soon remedied, terminates in sphacelus. That the smaller intestines, and the rectum, chiefly labour under dysentery, is not only proved by sound reasoning; as it is evident, that the great intestines destined for keeping the *fæces* are much less easily affected by the morbid stimulus, than the small ones; but is besides confirmed by this, that the griping pain in the dysentery almost always occupies the middle of the abdomen, the natural seat of the small intestines. In the bodies of more than forty persons destroyed by the dysentery, which I had an opportunity of examining after death, I found the small intestines seized with a severe inflammation, which had already partly terminated

* L. l. pt. 3, chap. vi, p. 226.

in mortification; whereas the cæcum and colon either exhibited nothing preternatural, or at most were sometimes here and there slightly inflamed. It is well known, that, on the contrary, Pringle, Stoll, Baker, and Baillie have found the great intestines alone affected, and the small ones either in their natural state, or only in a slight degree injured. The observations of these eminent physicians seem thus to be quite contrary to my own: a difference which cannot be accounted for, but by taking for granted, that in the different epidemics, and in different subjects, the disease makes it's attack on different parts of the alimentary canal; though I am disposed to believe, both from my own observations and the symptoms of the disease, that, in the simple dysentery, the chief seat of the disorder is in the small intestines, and in the rectum.

This catarrhal affection, when attacking the great intestines, though it does not in general kill so soon, but is protracted during a longer space of time, does not afford a more favourable prognosis: for, if not checked in the beginning by proper treatment, it either terminates in gangrene, or reduces the intestines into such a state, that though the dysentery ceases, the patients die of the depraved state of the bowels; for a colliquative flux, accompanied with a hectic fever, succeeds to the dysentery in such cases, by which the remainder of the powers are gradually broken, and death slowly arrives. In such bodies, Stoll, Pringle, Baker, and Cleghorn found the intestines, especially the great ones, thicker than usual, hard, and coriaceous, and in
some

some they saw scirrhus tubercles straitening the cavity of the colon in several places*.

It has been generally supposed, that this catarrhal inflammation of the intestines terminated in an ulcerating process, and that the ulcers of the intestines brought on the dysentery; this, however, is not the fact; the contrary is proved both by the observations of Pringle and Stoll, and by my own, for I never could detect even the slightest ulceration, either in the great or small intestines. I, therefore, believe, that when upon examination after death ulcers sometimes have been found in the inner membrane of the intestines, such appearance was occasioned by some accidental cause, and by no means owing to the nature of the dysentery.

As to the third. It has been already observed that the dysentery does not always appear under the same form, but exhibits various symptoms, according to its different complication; for a complicated dysentery is a disease compounded of the dysentery itself, and the morbid condition united with it; therefore the symptoms essential to a dysentery are indeed not wanting, but there exist with them others, which owe their origin to the morbid condition complicated with the dysentery: these differ greatly according to the various complications. The dysentery may be combined with sordes of the first passages, with an inflammatory, bilious, and putrid state, and nervous symptoms.

* Stoll, *Rat. med.* pt. 3, sect. iv, p. 191 and 199. Baker, l. 1, p. 381. Pringle *on the Diseases of the Army*, pt. 3, chap. vi, § ii, and Cleghorn, l. 1. chap. v, p. 227.

Sordes of the *primæ viæ* are most commonly joined with the dysentery; and they are almost always met with, even in a simple dysentery, in farmers, and hard working people, from their manner of living, though the season of the year, and the epidemical constitution, not seldom contribute to this complication; which is nevertheless the least of all to be feared, and can be readily gotten the better of.

The other complications are more dangerous, yet their cure, in general, is not very difficult, if they be simple, if they attack sound bodies, and if, in fine, they be opposed, at the commencement of the disorder, by proper remedies. If neglected, however, they commit great ravages. The complication of the dysentery with the putrid fever indeed is to be excepted, as this sometimes proves very difficult to be remedied, and, if not treated in a proper way, soon terminates fatally. I say, if the morbid conditions, complicated with the dysentery, be simple; since diseases already complex in themselves by their conjunction with the dysentery produce a very complicated disease, and, for this reason, scarcely yield to any treatment.

The danger of the dysentery differs therefore, according to the nature of the morbid state with which it is combined. This complication of dysentery depends in a great measure on the reigning epidemic: thus, for instance, the dysentery, which was epidemical in England in the year 1762, was bilious inflammatory, yet, when properly treated, it proved fatal to but few*. The dysentery epi-

* Baker, l. l. p. 374,

demie at *Vienna* in the year 1776 was bilious, and, when not soon cured, changed into a putrid one*. The dysentery, which ravaged *Gelderland*, and some other of the United Provinces in the year 1783, partook likewise of the putrid state†. The celebrated Dr. Frank observed lately an epidemic dysentery partaking of a strong inflammatory nature, in which all stimulants proved hurtful, and which gave way only to the free use of the lancet and the antiphlogistic plan of treatment‡. In fine, the dysentery epidemical in *Austria* in 1777 was very complicated, being of a putrid inflammatory nature, accompanied, in many subjects, with nervous affections. This dysentery proved mortal to many, especially to weak and cachectic persons, as, on account of the complicated state of the disease, neither an antiphlogistic treatment, emetic purgatives, tonics, nor anodynes, were able to cure or even to palliate the disease§. The great observer of nature Sydenham, though improperly criticised on this subject by Dr. Pringle||, was already conscious of the great influence of the epidemical constitution in modifying the dysentery. Therefore, he questions, whether there may not be as many kinds of this distemper, as of the small-pox, and other epidemics, which vary so much as, in some respects, to require a different method of cure.**

* Stoll, l. l. cap. ii, p. 183, et cap. vii, p. 218.

† Van Geuns, l. l. p. 12.

‡ *Ratio Instituti clinici ticinensis, in prefatione.*

§ L. l. cap. iv, p. 191. and cap. ix, p. 230.

|| L. l. p. 222.

** L. l. p. 180, and 181.

As to the fourth. The cure of a simple dysentery may not unfrequently be performed by a mild diaphoretic, such as the flowers of the common elder, and Dr. Tissot has often cured such dysenteries by giving large draughts of tepid water alone*. Though the simple dysentery cannot always be so easily removed, yet, an emetic and afterwards a purgative being premised, opium always performs the cure; and so soon, that the patients are restored to their former health within a few days†. Thus the simple dysentery is a mild disease, and there exists no example, that I know of, of it's having proved fatal, when a proper mode of treatment has been adopted in the commencement of the disease. Nay that the cure of this disease is, in the beginning, easy to be performed, is proved even by the observations both of Cleghorn and Pringle; the first of whom mentions, that “ Al-
 “ most all the dysenteries, which fell under his
 “ observation,” unless speedily cured in the begin-
 “ ning, at best proved obstinate, and too fre-
 “ quently fatal‡;” and Pringle says, that “ The
 “ learned Senac acquainted him, that having had
 “ good evidence for believing, that several had
 “ been cured by taking nothing, but large quan-
 “ tities of warm water, for five or six days toge-
 “ ther, he had successively made the experiment
 “ upon himself, and upon fourteen more, who
 “ submitted to that regimen. He added, that
 “ after having tried other methods, without being

* *Raadgeving voor de Gezondheid van den gemeenen Man*, cap. xxv, p. 269.

† Richter, l. l. kapitel v, p. 105. ‡ L. l. p. 228.

“ satisfied

“ satisfied with any of them, he had at last fixed
 “ upon the following, by which he had made
 “ numberless cures. This, after evacuating by
 “ bleeding, and by a vomit of emetic tartar, con-
 “ sisted chiefly in giving one grain of that anti-
 “ monial preparation dissolved in a pint of com-
 “ mon whey, or chicken-water, in divided draughts,
 “ every day, for all food, drink, and medicine,
 “ till the patient recovered* :” which evidently
 shows, both, that the dysentery observed by Sir
 John Pringle, as well as all the others, was of a
 mild nature, when not complicated with any other
 disease, and that the opinion of this eminent phy-
 sician, that the internal predisposing cause of a dy-
 sentery is a putrescent state of the blood, is quite
 erroneous†. For, not to mention that daily ex-
 perience proves, that many, without having the least
 mark of any tendency in the blood to dissolution,
 are severely attacked with the dysentery, it is evi-
 dent, that neither bleeding, an emetic, nor warm
 water, whether alone, or together with a small
 dose of emetic tartar, can by any means correct a
 putrescent state of the blood; nay, on the contra-
 ry, these remedies would promote it, if existing.
 This, then, is a fresh argument to prove, that a
 simple dysentery is nothing but a catarrh of the
 intestinal coats, which may be removed, at least
 in it’s commencement, by a gentle diaphoretic,
 such as tepid water. All the danger of the dysen-
 tery, therefore, depends either upon the epidemic,
 the peculiar disposition of the subject, or improper
 treatment. We saw before, that the most parti-

* L. l. p. 277.

† L. l. p. 252.

cular attention ought to be paid in the cure to the reigning epidemic, which is farther confirmed by a remarkable instance recorded by Stoll; who relates, that, in the year 1778, during an inflammatory epidemic, he had the care of a girl eighteen years old, in whom, on account of the constitution of the body, and a depraved taste, he suspected fordes of the *primæ viæ*, to remove which he prescribed an emetic purgative; but with such an unhappy effect, that, all the symptoms growing worse, she soon died*.

Though this instance proves, how much attention is to be paid to the epidemic in the cure of the dysentery, still the different constitutions of the patients ought always to be kept in view; for, on account of these, they sometimes require a manner of treatment not agreeing with the reigning epidemic. Thus, for instance, in an epidemic wholly averse to bleeding, venesection may yet be useful in the plethoric, on account of the too great orgasm of the blood; whereas, in an inflammatory epidemic, the blood ought to be sparingly drawn in weak and cachectic bodies: and, truly, if Stoll be to be reprobated in any thing, it is in this, that, attending carefully to the epidemical constitution, he generally paid little or no regard to the different temperaments of his patients.

It appears then, that the cure of the dysentery must be different, according to the different morbid state united with it, and that of course no certain

* *Rat. Med.* pt. iii, cap. xi, p. 233.

rules can be laid down for it's cure. Accordingly, if, for instance, the dysentery be of an inflammatory kind, recourse should be had to bleeding, and the whole of the antiphlogistic plan; by which means the inflammatory condition being removed, the complicated dysentery is changed into a simple one, to which the exhibition of opium will now quickly put a stop. If, on the contrary, a bilious or putrid state be complicated with the dysentery, bleeding ought to be avoided, and vomits and neutral salts are to be given previous to the use of opium. Lastly, if the dysentery be joined with nervous symptoms, the bark, contrayerva, snake-root, and wine, may occasionally be exhibited along with opium, with benefit to the patients.

But it is greatly to be regretted, that the circumstances by no means always permit us to go on so methodically with the treatment; for frequently we are called in, when the most immediate danger is imminent, and the patient's life entirely depends upon our manner of proceeding; so that if the proper opportunity of checking the complaint be lost, death is often ushered in within a few hours. If, therefore, the disease increase, the griping pains and tenesmus become more violent, the face turns pale, the eyes sink in, the pulse be weak and intermittent, and a great debility, attended with coldness of the extremities, hiccup, and cold sweats, come on; in a word, in all cases, wherein the urgency of danger is great, and the symptoms indicate an approaching gangrene of the bowels, the physician ought always to have recourse to opium; which remedy is to be given not in small but in large doses, and is the only
one,

one, that is able to put a stop to the complaint, when of a more alarming nature.

Most physicians, though they allow; that opiates do a great deal of good in dysentery, are yet of opinion, that, previous to their use, the *primæ viæ* are to be well cleansed by the exhibition of neutral salts dissolved in a large quantity of water for several days. Such a manner of proceeding may in most cases be unattended with danger in private practice, especially if the practitioner have been called in when the disease first makes it's appearance; but it would by no means be safe in the dysenteries happening in the navy and army; which are mostly of such severe kinds, that they would terminate fatally before the *primæ viæ* were properly evacuated by the neutral salts. Upon the whole I am very much inclined to doubt the propriety of such a treatment. For my own part, without losing time by repeated evacuation of the *primæ viæ* by the solution of neutral salts, I immediately give an emetic of ipecacuanha, if the stomach seem to be at all affected; after which I give my patients the mercurius dulcis from gr. v ad gr. xii, in order to evacuate properly the bowels at once; and then I proceed to the antidote of dysentery, opium. The calomel not only cleanses the *primæ viæ*, but it seems to have somewhat of an antidyenteric power; for it may be exhibited even to the most delicate constitutions with perfect safety, and frequently under it's use the gripings and pain abate. If, therefore, during the use of opium, fordes in the *primæ viæ* should appear, recourse is occasionally to be had to mercury.

The utility of opium in the dysentery, under such conditions, was long since known to physicians. Sydenham, treating of the dysentery, says, " Nevertheless, it ought carefully to be attended to, as a mean of snatching many from the jaws of death, that, as often as the gripings of the belly are continued to a confirmed dysentery, I am convinced, that it is very dangerous to oppose the distemper in the round about manner of evacuating, and afterwards palliating. As I have experienced, that the dysentery will be cured in the most certain, and quick way, if, laying aside all this circuitous practice, the flux be immediately stopped with laudanum: for this disease is so grievous, and violent, that, if, when the dysentery is already confirmed, you still endeavour to purge, it is much to be feared, that, on account of the vital powers being thence more weakened, the dysentery will either torment the patient longer, or kill, whatever treatment you may afterwards pursue. Therefore, when sent for, I immediately exhibit laudanum as far as twenty-two drops, twice within twenty-four hours, or oftener, at regular intervals, if the above dose have not been sufficient to check the gripings, and stools *."

The learned Dr. Ramazzini speaks of the use of opium in the following way: " Perhaps there is no disease, in which opiates may be given with more security, and in a greater quantity, than in this distemper, though the powers are almost worn down and exhausted. To a person labouring under the most violent dysentery, I gave at dif-

* L. 1. *Sced. Monit. de nov Febr. Ingressu*, p. 351 et 352.

"ferent times opium as far as three or four
 "grains, but with little benefit. He had re-
 "mained during many days totally cold, and
 "without pulse; the vital powers nevertheless
 "were not so languid, but he could move himself
 "to and fro; but I was afraid, that the opium,
 "if taken in a larger dose, might extinguish the
 "remains of the vital flame: however, I again gave
 "it to five grains, from which dose the patient
 "quietly slept, and became warmed *." In fine,
 the following are the words of the accurate investi-
 gator of the powers of opium, the celebrated Tralles:
 "I would not attempt the cure of a severe dysen-
 "tery without opium, or have I ever seen such a
 "one cured without this excellent gift of the Divi-
 "nity: no more proper remedy for this disease can
 "be invented by mankind, as it is it's most certain
 "antidote, justly called so by Bontius †."

These encomiums of opium in the dysentery are
 wholly corroborated by the observations of the mo-
 derns: thus, in the dysentery, which was epidemical
 in Friesland, and in the neighbouring countries, in
 1779, the evacuating plan recommended by Degner,
 Pringle, Tissot, and Zimmermann, being tried in
 vain, the physicians had recourse to the treatment
 recommended by Sydenham, by which most of
 their patients were recovered ‡. In this dysentery
 the learned Dr. Stinstra gave opium as far as eigh-
 teen grains, and the surgeon Leinsius as far as thirty
 six, within twenty-four hours, with the desired suc-
 cess. A lady, whose extremities were already cold,

* *Opera omnia const. Epid.* § 33, p. 201 et 202.

† *Terres Remed. Exam. rigid.* p. 168.

‡ *Acta Hagana*, vol. i, pt. i, a p. 983, ad 1008.

having taken at once *ʒi of laud. liq. Sydenb.*; was restored to perfect health *. Professor van Geuns administered in the dysentery opium as far as twelve grains, within twenty-four hours, with the same benefit †. In fine, I can add my own observations to those of other physicians, as I have seen about two hundred snatched from the jaws of death by the use of large doses of opium.

Opium is thus to be given in large doses, when the symptoms are urgent; for small doses of opium, though they often bring relief in a mild dysentery, yet, when the disorder is of a more severe kind, are not capable of performing the cure, and I have frequently seen the complaint exasperated by their use. The dose in which opium is to be taken ought, however, to be comparatively smaller or larger, according to the urgency of the complaint, the constitution of the patient, and the nature of the reigning epidemic; so that no quantity to be used in a certain time can be determined. Though in general dysenteric patients bear very well strong doses of opium without any bad effects, yet now and then, we are told, it operates like a poison, and excites an unusual tendency to sleepiness. If therefore on account of the imminent danger of life, recourse must be had directly to very strong doses of opium, the patients are continually to be watched; and, supposing sleepiness should come on, they are at any rate to be kept in continual motion, and by no means suffered to sleep. By these means, though opium was impru-

* L. l. p. 991, 995, 1007, et 1008.

† L. l. p. 35 et 36.

dently exhibited in too large a dose, yet the life of the patient might always be saved. I know several cases of persons, who took large doses of opium in order to destroy themselves, some as far as a drachm, and nevertheless, by the exhibition of an emetic, and by keeping them in continual motion, the bad effects of the poison were prevented from taking place. I thought it necessary to mention this caution, when opium was directly given in a very strong dose, though I am inclined to believe, that, paying proper regard to the patient, and carefully observing what effects the opium given has on the constitution, such an event would never happen even from the largest dose the most severe dysentery requires for it's cure. In fine, it is to be observed, that children comparatively cannot bear such strong doses of opium as adults: and the practitioner ought the more to be on his guard in administering opium to them, as, if unluckily the symptoms of an overdose of opium take place in children, we do not possess the same means of saving their lives as those of adults; for in them life is sooner destroyed, and the remedies we have spoken of to prevent the bad effects of opium do not operate so effectually. As soon as the complaint is mitigated, the opium is to be given in smaller doses, for in the same degree as the bowels return to their healthy state the patients become likewise more susceptible to the stimulus of opium, so that, if the practitioner go on with administering large doses of opium, he is liable often to do a great deal of harm. Not to mention, that, the use of opium being continued for a long time, the patients become so accustomed to it, that they feel themselves uncomfortable without opium.

opium. The convalescent require it for a long while, and cannot but by degrees be weaned from it's use, of which there have been many instances *.

As to the fifth: Physicians still dispute, in what manner the opium operates in the dysentery. Most are of opinion, that it acts by it's diaphoretic power: but though I readily grant, that it's diaphoretic virtue may somewhat contribute to it's effects, and would be quite sufficient to cure a slight dysentery, yet when it is considered, that many medicines, not inferior to opium in diaphoretic virtue, are not in the least efficacious in a severe dysentery †; that opium, taken when the gangrene of the intestines is coming on, prevents it, and acts as an excellent tonic; I cannot embrace this opinion. On the contrary, the efficacy of opium in this disorder seems to me to be rather owing to a specific power, by which it either prevents, or, when already existing, stops the gangrene communicated to the intestinal coats by the catarrh. This opinion seems to be confirmed, on comparing the gangrene of the intestinal coats produced by the dysentery with the gangrene observed by the learned Pott; as a great analogy exists between these two species of gangrene: for a grievous pain is observed in both; hot and stimulating medicines prove hurtful; both species elude the powers of the bark, and the other antiseptics; both gain ground quickly in some subjects, in others slowly; a great, and nearly equal quantity of opium is requisite for curing both; in

* *Act. Hagan.* vol. i, pt. i, p. 1009,

† *Act. Hag.* l. l. p. 996.

fine, the patients are able in both to bear considerably large doses of opium, without sleepiness, or any other injurious effect*. Now the gangrene described by the celebrated Pott, though he does not determine it's cause, seems to have been of a catarrhal origin; for Mr. Mulder, an eminent surgeon, observed in several dutch sailors, after a malignant catarrhal fever, a gangrene perfectly agreeing with that mentioned by Pott in it's external appearance, in it's symptoms, in it's cure, and in every point †.

The following inferences may be drawn from what I have shown above:

1, That the dysentery, by itself, is always a mild disorder, and only becomes dangerous and mortal by it's conjunction with the reigning epidemic, or with some other morbid state.

2, As the causes, which render the dysentery fatal, are very different, it follows of course, that no specific can be invented for the dysentery; though opium may justly be considered as such in most cases.

3, The reason, why Degner, Pringle, and Tissot, are mistaken, with regard to the dysentery, is only, because they drew general rules from one epidemic, and considered the symptoms of a complicated disease, as so many characteristic marks of the dysentery.

* See the dutch translation of Potts' Remarks on the Palsy of the lower Limbs, with the notes of my worthy preceptor, professor Du Pui.

† L. I. part ii, p. 83, et seq.

4, As the catarrh of the intestinal coats, or the dysentery, has a strong tendency to gangrene; and, as it is observed, that all hot and stimulant medicines promote this propensity; it may be concluded, *a priori*, from sound reasoning alone, that the use of rhubarb must be hurtful in the beginning of this disease. This is perfectly confirmed by the observations of practitioners. Dr. Huck asserts, that salts and manna are a better purge than rhubarb in the beginning of the dysentery; and most of the english physicians employed in Germany during the war, in 1756, experienced the same *. Sir George Baker notes, that rhubarb ought to be totally laid aside in the commencement of this distemper †. Dr. van Geuns is of opinion, that this remedy suits the end better than the beginning of the dysentery ‡. The eminent physician Stinstra declares, that rhubarb has only injurious effects §: and the illustrious Richter not only agrees with him, but is of opinion, that no purgative does more harm in the beginning of the dysentery, than rhubarb; and mentions several cases, in which the patients had died of gangrene in the bowels, contracted merely by the use of rhubarb ||. Therefore rhubarb is to be omitted in the commencement of the dysentery, and ought only to be made use of towards the end of the disease, to strengthen the *primæ viæ*.

5, As astringents do not in the least prevent or cure the propensity of the intestines to inflammation,

* Pringle, l. l. § 4, p. 266.

† L. l. p. 376.

‡ L. l. p. 38.

§ *Art. Hagan*. l. l. p. 985.

|| L. l. p. 98.

or gangrene; but, on the contrary, by their stimulating power, rather promote it: as besides, in the complicated dysentery, they prevent the discharge of the noxious matter; all astringents ought during the course of any dysentery to be avoided with the greatest care, and they should only be given to fortify the alimentary canal, when the dysentery is already vanquished. Indeed all reasonable physicians agree, that, if astringents be useful, it is only when a laxity and debility of the bowels remain after the disease.

6, In fine; as to the use of the demulcent, and oleous medicines, so strongly recommended in this disease, the demulcent can never injure, and prove useful in many cases, to abate pain and violent gripings; the oleaginous remedies on the contrary are not only useless, but also frequently hurtful: for they often adhere to the intestinal plicatures, contract rancidity, and excite grievous pains, remaining even a long time after the dysentery is vanquished, and ceasing only when the rancid oil is evacuated *. Consequently we should never have recourse to oily medicines in the dysentery.

As to the sixth: Most physicians state as an axiom, that the dysentery is a contagious disorder. I am sorry to be here again obliged to recede from the common opinion, as the following arguments seem to prove, that the dysenteric contagion is a mere product of the fancy.

* *Act. Hag.* l. l. p. 1000.

1, The mode of operating of the dysentery is quite different from the way in which all contagions are communicated to the animal body. For these, being either applied to the lymphatic vessels, are not taken up before a certain assimilation is produced between them and the absorbents; or they are immediately communicated to the blood, and thus exercise their noxious effects; whereas the dysentery acts in a quite different way: indeed, what excites this distemper is by no means absorbed, or does not enter the blood, but is for the most part communicated directly to the intestinal coats from the atmosphere, and thus produces the dysentery. This disorder then differs from all contagions, both in it's manner of acting, and symptoms.

2, The clothes, bedding, and other articles of household furniture, which those who died of dysentery had made use of in the most severe epidemic of Harling, did not occasion the least bad effects, when sold to other persons, without any previous cleansing*. Now it is well known, that all these spread the contagion of infectious diseases.

3, All contagions whatever may indiscriminately show themselves during the whole year: on the contrary, I do not know that the dysentery ever appears, except towards the end of the summer, and in the beginning of the autumn.

4, The dysentery seldom enters the houses of the rich, at the same time, that it rages greatly among

* *Act. Hagan*, l. l. t. i, p. 951.

the lowest of the people, as is noted by all the authors, who have written on this disorder *: whereas all contagions equally affect all ranks from the palace to the cottage. An evident token, that the dysentery is not a contagious disease.

5, The nature itself of the dysentery demonstrates, that it is not infectious: for I have above proved, that it is an intestinal catarrh, and it is well known, that the catarrhal affections are indeed epidemic, but not contagious.

6, The renowned Dr. Zimmermann has observed, that the dysentery chiefly seizes persons, whose perspiration is often suppressed, on account of their manner of living, and that, therefore, it is more frequently met with among farmers, and common people †. He afterwards says, that, according to the observations both of the learned Mohrlin, and himself, those had principally escaped the dysentery, who, having avoided errors in diet, had farther abstained from large draughts of cold water, when the body was hot, and who had kept up an uninterrupted perspiration day and night ‡. Dr. Stoll has observed the same §. Now it would be difficult to explain, how a contagion is contracted on account of the perspiration being suppressed, and how, on the contrary, it may be prevented by promoting perspiration.

† Baker, l. l. p. 379: *Act. Hagan.* l. l. p. 947: Van Geuns, l. l. p. 85: and Degner *Historia Medica de Dysenteria biliofo-contagiosa*, p. 27.

‡ *Von der Rubr.* p. 34.

§ *L.* l. p. 77.

§ *Rat. Med.* pt. 3, p. 225.

7, Though the illustrious Pringle admits, in some degree, the infection of this disease, still he agrees, that the dysentery is of a less infectious nature, than any of the other contagions *; and it may even be concluded from his own observations, that the dysentery is not in the least infectious: for he says, that, “ As conducive to the cure, and as a preservative against a relapse, especially when the weather begins to grow cold, the convalescent ought to be provided with under-waistcoats;” and that, “ some of the officers, who had been subject to returns of the flux, had informed him, that they had found much benefit from wearing a flannel waistcoat next their skin †.” Now as a flannel waistcoat can have no other effect, than to keep up an uninterrupted perspiration, it is evident, both that the dysentery is nothing but a catarrh of the intestinal coats, and that it’s contagion is merely imaginary.

8, Neither are there wanting practical observations, which refute the opinion of dysenteric contagion. The immortal Sydenham does not mention any infection, that attended the epidemic described by him: and the eminent physician Willis expressly says, that the dysentery he observed, and which was the same of which Sydenham speaks, was not infectious ‡. The learned Vander Haar observes, that the dysentery is not conveyed by infection from the sick to the sound, as is commonly believed; but that it is only propagated on account of the

* L. l. p. 255.

† L. l. p. 286.

‡ *Pharmac. Ration.* sect. 3, cap. 3.

epidemic, and the condition of the air which favours it *. In fine, the celebrated Stoll speaks thus on the subject. “ There are only a few, who question the dysenteric contagion; and most physicians are of opinion, that this effluvium may be communicated from the sick to the attendants. I am really surpris’d, how we the physicians, the assistants of the physicians, and the nurses, have remained free from the dysentery, during so many years: although we every day looked at the *faeces* discharged the preceding night, and even, in spite of ourselves, smelled the stinking effluvia †.”

9, I can assert from my own experience, that the dysentery is by no means an infectious disease. For, in the year 1794, during an epidemic camp-dysentery among the hanoverian troops, which formed a part of the british army under the command of his Royal Highness the Duke of York, and had their military hospital at that time at Leyden, I daily visited the patients in company with those, to whom their cure was committed; I breathed the air filled with the effluvia of the patients during a long time, nay there was sometimes such an offensive smell in the wards, that it was with difficulty I breathed at all; and, at last, it is true, I contracted a severe cough, but remained free from the dysentery, as well as my worthy preceptor the celebrated Dr. Brugmans, who dissected the dead bodies, and all the physicians and surgeons of the hanoverians, the

* *Vrye gedachten en Aanmerkungen over het niet Besmettelijke van den Roodeloop, Algem. Vaderl. Letteroeffeningen, 1783, Mengelw, blad. 577—584.*

† *Rat. Med. part 3, sect. iv, cap. viii, p. 222 et 223.*

nurses,

nurses, and other attendants of the sick. Thus a camp-dysentery, which is commonly believed to be very infectious, was here evidently free from contagion: therefore I cannot but agree with Stoll, who observes, that indeed different and malignant disorders may arise from the air corrupted by the stools of those who labour under the dysentery; but that the same disorder is by no means communicated to others, as in the small pox, and other contagions*.

It appears therefore, that when the attendants and nurses of the sick are sometimes attacked by the dysentery, of which instances are recorded, both by van Swieten and Pringle, this is by no means to be explained from the infection being propagated from the sick to the sound, but from the prevailing condition of the atmosphere, by which the attendants and nurses of the sick are as capable, and perhaps more liable on account of their situation, to be affected as other persons. For it is clearly proved, that a simple, or genuine dysentery is wholly exempt from all contagion, and that, though the complicated dysentery, as an occasional, or exciting cause, may communicate different diseases both to the attendants, and others, nevertheless, it is by no means infectious: for according as the predisposition differs in various bodies, there arise different effects from this exciting cause, so that one is seized with a catarrh, another with a sore throat, a third with a cough, a fourth with a bilious fever, a fifth with a putrid one, and, in fine, a sixth with the dysentery

* L. 1, p. 223.

itself; while a seventh, in the body of whom the predisposition to these morbid conditions is wanting, though attending the dysenteric patients, enjoys uninterrupted health; whereas all contagions whatever, though differently modified, according to the different constitution of the persons, always produce the same disease in every one.

As to the seventh. The means of preventing the dysentery consist in observing the three following precepts.

5, Let a person remain at home both morning and evening, for thus the morbid stimulus, then the most powerful, will be prevented from acting on his body; the suppression of the perspiration should be avoided with the greatest precaution; and the perspiration must be restored by diaphoretics, if unfortunately suppressed.

2, Let him be abstemious in his diet, that is, let him be cautious of eating or drinking too much: for the rest, it is not necessary, that he should live only upon vegetables; on the contrary, a moderate use of animal food is adviseable.

3, As the way, by which the noxious stimulus enters our body in the dysentery, is principally the alimentary canal, and as any organ is the more easily affected, the more it is weak and irritable, the *primæ viæ* are to be strengthened, in order that they may be capable of repelling the morbid stimulus, and whatever disturbs their functions should be avoided with the greatest care. For this purpose
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the bark in conjunction with some bitters and a little rhubarb, proves useful. Being digested two days with french white wine, port wine or geneva, which may answer the purpose as well as wine, except for persons of weak and delicate constitutions, the tincture may be taken daily as far as a few glasses; I do not add the rhubarb with the intention of purging, but of strengthening, and as it at the same time prevents the bowels from becoming filled up with fordes. I have frequently made use of the following formula for a bottle of wine.

℞ Rad. Gent. ʒss.
 Cort. Peruv. ʒi.
 Rad. Rhe. ʒi.
 Flor. Lavend. m. i.
 F. collectio.

If these rules be accurately observed, if besides a physician be consulted on some precautions, which sometimes are requisite, either on account of the epidemic, or the peculiar disposition of the body, of which I cannot here take notice, the dysentery will be almost always avoided. This is not a mere theoretical speculation, but is founded on practical facts; for three years ago, during an epidemic dysentery, I prescribed the above medicines to many persons, with such success, that not one of them was seized with the reigning disease; and though among this number there were many persons, whose daily occupations did not permit them to stay at home either morning or evening, yet by making use of the above medicines, and wearing flannel shirts next to the skin, they all remained free from the distemper.

As to the eighth. The manners of dying by the dysentery may be reduced to the four following; viz. a fainting, a colliquative flux, an inflammation of the intestines, and a chronical dysentery. I have already spoken of the manner in which the first three kill; and as to the chronical dysentery, it, for the most part, agrees with the colliquative flux, as in both cases the vital powers being continually more and more exhausted, the patient slowly dies. Still it differs from the latter, in as much as pain is always felt at the time of going to stool by those who labour under the chronic dysentery, and there exists a chronic inflammation, together with a thickness and induration of the coats of the intestines.

GENUS III.

Cholera.

THE cholera morbus is a constant and violent discharge of the contents of the *primæ viæ* by vomiting and purging. The disease is preceded by nidorous eructations, heart burn, pain of the stomach and intestines: afterwards excessive vomiting and purging come on, attended with acute pains and gripings of the intestines, especially in the umbilical region; tension of the abdomen; retention of urine; quick, weak, irregular pulse; spasm of the abdominal muscles; palpitation of the heart; prostration of strength; cold sweats; hiccup; great thirst; anxiety; and universal convulsions.

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The remote causes of the disorder are various. The chief is an increased secretion of bile of an acrid kind, occasioned by the warmth of the atmosphere; for the complaint prevails only in the warm seasons, and the matter rejected, both upwards and downwards, consists chiefly of acrid bile; another main cause, which not unfrequently acts in conjunction with the former, is the perspiration being suppressed from an exposure to cold rainy evenings, after extremely hot and dry days: and hence the disease usually occurs at the end of august, and in the autumnal months. The less frequent are food of difficult digestion, fruits used in excess, and violent passions of mind.

The proximate cause consists in violent spasmodic constrictions through the whole extent of the alimentary canal, by which an acceleration and inversion of the peristaltic motion of the stomach and bowels are produced. These convulsive motions are commonly communicated to the abdominal muscles and frequently to those of the thighs and legs.

The prognosis is favourable, when the disease attacks young persons, when a gradual diminution of all the symptoms appears, and this is succeeded by quiet sleep, and a gentle moisture on the skin. On the contrary, syncope, coldness and spasm of the extremities, extreme debility, fetid vomiting, cold sweats, hiccup, and an intermitting pulse, are dangerous signs. In old people, the disease is always very formidable, as, on account of the shock communicated to the constitution by it, the strength is

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often suddenly weakened, and the patient's life is sometimes destroyed in the course of a single day. The disease, however, for the most part, puts on a less alarming appearance, and life may generally be saved, by having recourse to a proper treatment in the beginning of the disease.

The cure depends upon promoting the evacuation of the redundant acrid bile, by the plentiful exhibition of diluents, and allaying the too great irritability of the *primæ viæ* by opiates. Chicken broth, warm water and milk, thin rice gruel, the almond emulsion, the decoctum album of Sydenham, and the emulsion of gum arabic, answer the first indication. Emollient glysters frequently thrown up prove likewise very useful. If the vomiting should continue, an infusion of chamomile flowers, mint tea, or the saline draught, should be given, and anodyne and warm plasters, and even blisters are to be applied to the region of the stomach. Though the purging should not be suddenly or totally stopped, yet, in dangerous cases, where the strength of the patient is very much weakened, and the spasmodic contractions become very violent, and are communicated to other parts of the body, the irritation should be immediately obviated by a free use of opiates, given in a small bulk, either by the mouth or by glyster. The warm bath, spirituous fomentations, and even blisters applied to the abdomen, are frequently found to alleviate the severe pain and spasmodic contractions of the bowels. In cases where the pulse is small, or full and hard, and the patient plethoric, venesection is to be performed. When the disease is subdued, it

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is necessary to strengthen the *primæ viæ* by the exhibition of bark and chalybeates, joined with aromatics and opiates : thus the predisposition to relapse, to which the patients are otherwise extremely liable, will be effectually removed.

If the cholera prove fatal, either the patient's life is destroyed amidst universal convulsions, or a mortal syncope ensues in consequence of the shock the system undergoes from the constant and violent vomiting and purging.

GENUS IV:

Of the Vomitus Cruentus, Morbus Niger, Hepatirrhœa and Hemorrhoids.

ALL these morbid affections I consider as one disease, differing only with respect to the seat of the complaint and the violence of the symptoms; since it appears from the observations of practitioners, that these disorders often succeed each other in an uninterrupted series*. I have myself cured a patient, in whom the vomitus cruentus, the morbus niger, and the hepatirrhœa, successively followed each other, and who before had frequently laboured under the hemorrhoids.

* Richter, l. l. kapitel ix, p. 144.

The nature of this disease is involved in much obscurity, yet on considering the attendant symptoms, and comparing them with what is observed on dissection of such bodies, the disorder seems to originate from a distention of the veins beyond their tone. This is proved, not only by the hemorrhoids, which, considering their different seat, perfectly agree with the morbus niger; but also from the observations of Kampf, Tissot, and Stoll, who have always found the veins of the affected organ enlarged by varices in such bodies *. Thus either the dilatation or rupture of the vessels, in some part of the body, seems to constitute the proximate cause of these four disorders; which have received different names, because different effects are observed, according to the organ attacked: Thus, if the complaint have it's seat in the *rectum*, hemorrhoids arise; whereas, if the vessels of the stomach, or of the upper part of the bowels, or the vasa brevia of the spleen suffer, the vomitus cruentus is the consequence: and if the disorder originate from the vessels of the liver, spleen, or bowels, the morbus niger is produced; yet so that the blood from the rupture of the vessels both of the liver and spleen is commonly of a deeper black hue, than that, which flows out of the vessels of the intestines: lastly, if either a diapedesis of the vessels take place instead of their rupture, or the ruptured vessels, beginning again to contract themselves, prevent any

* I. Kampf *Abhandlung von einer neuen Methode die Hypochondrie zu heilen, dritten auflage, Wien 1788, cap. viii, p. 383 and 450; Tissot Epist. ad Zimmermannum de Morbo nigro, Scirrhis Viscerum &c. obs. 1, p. 9, and obs. 2, p. 17, & Stoll Rat. Med. pt. 1, sect. xiv, p. 154, and pt. 3, sect. v, p. 253.*

thing flowing out except bloody serum, resembling the water in which flesh-meat has been washed, there arises a flux of the liver; and hence may readily be explained, why the morbus niger so often terminates in this flux.

The remote causes of this disease are a lazy, sedentary life, food of difficult digestion, want of bodily exercise, indulgence in the luxuries of the table, sedative passions of the mind, &c. As these causes often exist without occasioning the morbid condition of which we are now speaking, it follows, that a certain predisposition of the system is necessary, in order that the exciting causes should bring about the specific alteration of the sanguiferous system: and this consists in a certain organic disposition of the constitution; for these causes do not produce the disease, except in persons either of a choleric-melancholic, or of a phlegmatico-melancholic temperament; in both which, there is naturally a degree of torpor of the vital principle, and a general rigidity of the whole habit, in the performing of the functions both of body and mind. Persons of this cast are of a serious thoughtful disposition, and less moveable than others by any impressions, but are remarkably tenacious of whatever sentiments happen to affect them. This melancholy disposition is not attended with any morbid affection either of body or mind; but when the exciting causes of a sedentary life, want of exercise, sedative passions of mind, and full manner of living, concur with this disposition, then it becomes a disease affecting both, but the mind principally. For the digestive powers being incapable of converting the

large quantity of food taken into proper chyle, the natural consequence is, that a vitiated lymph is transmitted to the sanguiferous system, but the blood vessels, naturally slow in their action in such subjects, are not disposed to act on the lymph with due force, or to clear the blood from it's fordes by the urine and insensible perspiration: thus the equilibrium between the blood vessels and their contents is destroyed, and an over-distention of the vessels takes place, on account of the excrementitious fluids being retained in the circulation; and as the balance of the sanguiferous system is manifestly upon the side of the veins, these become distended beyond their tone. As the action of the vessels is always in the compound ratio of the stimulus applied, and the faculty of reaction depending upon the organic structure of the part affected, it is evident, that the vessels, being specifically stimulated by the vitiated blood, specifically react on the mass of blood, and of course the blood must become daily more and more altered from it's healthy crasis, and the complaint gradually grows worse and worse. The disease generated by this morbid state of the sanguiferous system, however, is not the morbus niger, but melancholia, differing in it's degree in the cholericomelancholic and in those of a phlegmatico-melancholic temperament; so that it is to be cured in the former subjects by the less stimulating or cooling aperients; and in the latter, by having recourse to those of a hot stimulating kind: though all these remedies generally prove ineffectual, without a proper control over the patient's mind.

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But as all the vessels of the sanguiferous system do not propel the blood with equal force, and the veins of the abdomen are those which possess the least energy, the circulation of the blood being slowly performed in them even in vigorous health, this first stage of melancholia, when not remedied either by nature, or by art, soon changes into the second: for the black and dense blood of the melancholic, flowing towards the abdominal veins, is conveyed much more slowly than usual through these vessels. If thus the quantity of blood be in no way diminished, and at the same time the circulation be rendered much slower, the consequence must be, that, the equilibrium between the vessels and the blood being disturbed in these parts, some veins are considerably distended; and these would become entirely destitute of tone in a few days, were it not, that the blood, from a law common to all the fluids, ever flowing toward such parts as oppose the least resistance to it, is now carried, for the greater part, to the collateral branches; these, however, soon sink under the unusual weight, and suffer also a preternatural distention: hence may be explained, why in such bodies the whole surface of any abdominal viscus presents, as it were, a net of distended and varicous veins. Such a varicous dilatation of the vessels takes place in different viscera of the abdomen, in proportion as one is more weak than the others, and according to the various employments of the patients: and hence it may be readily explained, why in one melancholic patient the anxiety takes place at the region of the stomach, in another in the right side of the abdomen, in a third in the lower part of the belly,

and in a fourth through the whole abdomen: though a sense of weight, pain, and fullness, together with the other symptoms of the disease, is mostly observed in the lateral parts of the abdomen, especially in the right side, because the circulation of the blood in the most healthy persons is very slowly performed in the system of the *vena portarum*.

In this stage of the disease, or sometimes before it, the vital powers, on account of the many disorders in the animal economy, often exert unusual efforts, to expel the noxious matter from the body, and to restore the equilibrium between the vessels and the blood. A fever then arises, by means of which, if not too violent, nature not unfrequently accomplishes her purpose, and the morbid matter is discharged from the body by a happy crisis; as Kampf and Grant have demonstrated, that intermitting fevers, and the simple synochus, often originate from this morbid condition of the abdominal viscera*.

These fevers, however, are, strictly speaking, not idiopathic, but symptomatic. Their treatment has been considered, when we were on the subject of ague. But if these efforts be either wanting, insufficient, or imprudently suppressed, the complaint increases, and, at length, the various veins undergo a chronic inflammation, which seems to be another and more violent effort of nature to get rid of the

* Kampf l. l. kapitel i, p. 15; and Grant, vol. i, of the synochus non putrid. p. 151.

morbid stimulus. Therefore pain of the affected organ in a greater or less degree invariably precedes the morbus niger, and the other morbid affections belonging to it*. This chronic inflammation of the vessels may be protracted for a long time, and, if not remedied, either by art or nature, in it's commencement, it terminates in three ways, viz. either the turgid vessels suffer diapedesis, and there flows out a bloody serum, in which case the hepatirrhœa is produced: or, which more frequently happens, a rupture of the vessels takes place; and in this case, according to the part affected, either a vomitus cruentus, the morbus niger, or the hemorrhoidal flux, ensues; the last of which often effects a happy crisis: or, in fine, this chronic inflammation changes into induration, when the total destruction of the organical composition of the affected viscus follows, and hence the scirrhotities of the viscera, for the most part, take their origin†.

Although the circulation is very slowly performed through the veins dilated by varices, yet a real obstruction of the vessel by the stagnant blood, though generally taken for granted, never, I believe, exists in the living subject; on the contrary the blood is conveyed through these varicous vessels in an interrupted course, as long as their organic composition is not wholly destroyed. Indeed it may be easily proved by repeated observations of

* Richter l. l. kapitel ix, p. 145, and Tissot l. l. p. 5, & obs. ii, p. 13.

† Tissot l. l. obs. iii, p. 26 & 27.

nature,

nature, by the structure and function of the affected parts, and, in fine, by sound reasoning, that neither obstructions, nor infarctus of the vessels by stagnant blood, ever exist; and that the medicines called resolvents by no means operate by resolving an accumulated thick matter. If only the varicous dilatations of the internal veins be compared with the external varices, what strength does my opinion thence acquire!

1, It is well known, that some ladies are afflicted with varices of the lower extremities in the first months of pregnancy, that they usually labour under them till their delivery, after which the disorder often ceases spontaneously; which manifestly shows, that there is always a communication between the blood contained in these veins and the other blood-vessels, and that their varicous state is by no means to be imputed to the accumulation of the stagnant blood, but only to it's reflux being prevented by the pressure of the uterus upon the trunks of the veins; of course no obstruction of the vessels exists.

2, The most turgid varices are often cured merely by applying a moderately tight bandage, if the veins have not entirely lost their tone: an evident sign, that no obstruction of the vessels by stagnant blood takes place.

3, Very copious hemorrhages often arise from inveterate varices, so that even danger of death sometimes attends them*: another sign, that the

* Richter *Anfangsgrunde der Wundarzneykunst*, erster band, kapitel xx, p. 408.

veins, though varicous in the highest degree, always keep up a communication with the rest of the sanguiferous system.

As it is thus proved by the varices of the external parts, that there exist no obstructions, so my opinion is farther supported by the structure and function of the affected organs. For instance, let us suppose, that the liver, a viscus liable the most of all to infarctions according to the common opinion, labours under an obstruction of the system of the vena portarum; the consequence must be, that the blood, which is carried to it from all the veins of the abdomen, and should serve for the secretion of the bile, cannot pass through, but flows back towards the abdominal viscera. What great disorders must not hence arise in the circulation, and in the whole animal economy? for when the bile is wanting, digestion cannot be performed, the chyle is not properly prepared, in a word all the functions must necessarily languish for want of the requisite stimuli. Besides, the obstructed liver will occupy a much larger space than usual, on account of the stagnant blood, of course the stomach, and the other parts, removed from their natural seat, must suffer the greatest compression. How great a degree of tension and pain must necessarily follow from all these changes is manifest, from the situation and connexion of these parts; and is farther proved by the symptoms attending a stoppage of the circulation through the liver, in consequence of the total degeneration of this organ, a remarkable instance of which is recorded by Tissot. The patient suffered so many and such severe complaints, that

that this physician, otherwise very averse to the use of opium, in this case gave it in a large dose, with the intention only of mitigating the intolerable pains*. As in those cases, wherein according to the common opinion obstructions exist, these symptoms are always wanting, this is a fresh proof, that no obstructions exist in the living body.

Let it not be argued, that all the vessels of the vena portarum do not become obstructed, but only some of them: for, beside that the stagnant blood would continually stimulate these vessels, and that this stimulus must naturally effect a strong contraction of them, by which the obstruction would be immediately removed, the internal coat of the sanguiferous vessels is provided with a great number of lymphatics, which, incited to act by the stagnant blood, would directly render the passage free by the absorption of the superfluous quantity. Finally, in dead bodies obstructions can never be discovered, and nobody has hitherto proved their existence, even by a single specimen from dissection.

I have had an opportunity of observing the state of the viscera after death in a great number of bodies, but in none of them have I ever met with either an obstructed blood vessel or gland. In the cases, wherein the mesenteric glands are swelled and indurated, my worthy preceptor professor Brugmans commonly injected mercury through them with the same facility, as through sound glands: the morbid matter was not deposited in

* Tissot l. l. obs. iii, p. 24.

their cavity, but between their cellular texture. Indeed I dare venture to affirm, that both the vessels and the glands always remain pervious, as long as their organical composition is not wholly changed; of which indeed I have sometimes seen instances, though I never found a total degeneration either of all the glands of the mesentery, or of the whole liver, and I believe, that these cases very seldom take place.

What now is to be said of resolvents, as they are commonly called? Calomel is one of the most powerful; yet is it to be believed, that a few grains of this medicine, having already undergone various changes both in the *primæ viæ* and in the lymphatic system, are nevertheless still able to resolve stagnant accumulated blood, or the obstruction of any vessel in the sanguiferous system? Who will maintain, that three or four grains of emetic tartar, given in divided doses, act by resolving a thick accumulated matter? Do not, on the contrary, these instances show, that the resolvents operate not immediately on the fluids, but act upon the solids, and impress on them a certain and determined motion, by which the blood is cleared of the morbid matter, which is carried by the *vis naturæ medicatrix* to different emunctories, and expelled the body? This is farther confirmed by the manner of operating of the hot resolvents, as they are commonly called, which, beyond all doubt, act on the solids, as, on account of their violent stimulus, they are only to be given to patients of a cold indolent temperament, or an advanced age. But to resume my subject.

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The black disease arises then from a rupture of the vessels, mostly brought on by a previous chronic inflammation, which nevertheless is not requisite to this disease, because the rupture of the veins dilated by varices may arise from too great extension alone, without any previous inflammation.

The morbus niger is preceded by a sense of fullness and pain at the place where the rupture of the vessels is to happen, which is a certain sign of the approaching disease. The patients are likewise afflicted with nidorous eructations. This disease never takes place before the constitution has undergone a specific alteration; which is clearly marked in the features of the face, for these patients have a peculiar dark fallow countenance, so that the practitioner, by a mere look at the face, may find out the disorder they labour under. This strabillious constitution, as it is usually called, never exists in the healthy state, but is always the effect of the inveterate melancholia, and caused by the long continuance of the disorder: hence the disease in question never attacks youth, but mostly people of a somewhat advanced age, who have laboured under melancholia for a considerable length of time. The paroxysm begins with a vomiting of black blood, or with copious bloody stools of a black hue; the quantity of blood discharged is often surprising; the patients are deadly pale; violent gripings of the bowels, with tension of the abdomen, cold sweats, fainting, and an intermittent pulse, are not uncommon symptoms; and sometimes the patients expire under the evacuation.

As the disease is of such an alarming nature, the physician should immediately attempt to alleviate the violent gripings of the intestines, the acute pains at the umbilical region, and the tension of the abdomen, by the use of tamarind whey, the decoctum graminis, and taraxaci, extractum graminis, and tartarus solubilis, and in cases of urgent danger, by small doses of opium and ipecacuanha, demulcents, emollients, glysters, and by applying sheets dipped in cold water to the abdomen. As soon as by these means the paroxysm has been removed, and the stools take on their usual appearance, the bark, Iceland-liverwort, asafœtida, and dulcamara, in conjunction with a moderate use of wine should be employed, in order to strengthen the habit; for otherwise the disease generally returns after some days.

But though by the tonic plan the patient's strength may be restored, so as to allow him to return to his usual occupations, yet the predisposition to the complaint is not removed by these tonics: there is always a tendency to relapse, as soon as the patient is exposed to an exciting cause; and the disease usually sooner or later makes it's appearance again. This happens repeatedly, the intervals between the paroxysms become shorter, the strength is gradually exhausted, and at last the patient sinks under the disease. The removal of the atrabilious constitution, when it has once taken place, is a matter of much difficulty; and the change of the constitution to the healthy state, or the radical cure, is not to be expected but from a long continued use of aperients joined with tonics, a simple diet of easy digestion, and regular manner of living.

The hepatirrhœa, differing only in degree from the morbus niger, requires the same treatment.

With respect to the hemorrhoids, if they be critical, nothing should be done, but to prevent coctiveness, and to mitigate the pain by fomentations. When they are symptomatic, topical bleeding by leeches, or by the lancet; the use of cooling purgatives; and the application of the unguentum nutritum with rubigo martis, to the affected part; will generally afford relief. If these should prove unsuccessful, the piles are to be removed either by ligature, or by excision; but all this is to be understood of the hemorrhoids when a local disorder of the rectum, as is very frequently the case; for when they are a constitutional complaint, recourse should be had to the same treatment as recommended in the morbus niger.

If the patient be destroyed by the morbus niger, it is in consequence of the copious and profuse discharge of blood by vomiting and purging; the blood infused into the alimentary canal operates as an extraneous body bringing on an acceleration and inversion of the peristaltic motion of the stomach and bowels; hence the remedies taken in are often immediately thrown up again, or discharged by stools; one fainting fit succeeds to another, from the loss of so great a quantity of blood; and these symptoms continue, till the patient falls at last into a mortal syncope, by which the scene is closed.

O R D E R II.

Hæmorrhages.

Hæmorrhages, in whatever part of the body they appear, bear a great analogy to each other in their causes, symptoms, prognosis, treatment, and manner of destroying life; of course there is no need of treating particularly of each. A general view of them is quite sufficient; except the hæmoptoe, which, on account of the importance of the afflicted organ, it's peculiar symptoms, and the manner of treatment it requires, deserves separately to be considered. Therefore in this order I shall treat first of hæmorrhages in general, and secondly of hæmoptysis in particular.

As to the first. A hæmorrhage is a copious and quick effusion of blood, either spontaneous, or excited by violence.

Whatever dilates the orifices of the vessels, or produces a rupture of them, may occasion a hæmorrhage. The spontaneous hæmorrhage chiefly owes it's origin to the disturbed action of the sanguiferous system, by which the blood is not equally conveyed through the whole body, but is driven to some organs in a greater quantity, and quicker course: for the vessels of these organs, thus quickly distended beyond their tone, by the great quantity of blood conveyed to them, suffer either a dilatation, or a rupture; especially if the vessels want sufficient

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force to resist, either from the weak condition of the patient, or the peculiar debility of the affected organ.

Though this cause alone may sometimes produce a hemorrhage, still, for the most part, another cause is added to this unequal distribution of the blood, which is the reaction of the *vis vitæ*: for, as soon as the vessels are more than usually distended by the too great quantity of blood conveyed to them from an innate faculty in every part of the animal body to avert all inconveniences, they directly collect all their powers to drive forward the redundant blood, and by their violent contraction greatly contribute to bring about a dilatation or rupture in the vessels. Cullen has ingeniously explained the reason, why hemorrhages, returning at several intervals, always attack the same organs, from this, that though the superabundant blood is taken away in the affected organ by the hemorrhage, the causes yet remain, by which the accumulation of blood to this organ is produced, which causes now more easily than before bring on a congestion, because the vessels of the organ, before attacked by the hemorrhage, make less resistance to the torrent of blood, on account of their relaxed tone *.

A peculiar degeneration of the sanguiferous system is sometimes among the causes of hemorrhage: for the vessels, in the highest degree of the scurvy, the lues venerea, and other diseases, fre-

*. *First Lines of the Practice of Physic*, vol. ii, book iv, chap. i, sect. ii, p. 265.

quently undergo such an alteration that the blood flows out, as it were, through a sieve, along their whole extent. In such cases the hemorrhage is to be imputed neither to the unequal distribution of the blood, nor to the too great reaction of the vessels; but, on the contrary, to the great languor of the vessels, through which, being stimulated by the preternaturally altered blood, they instantaneously suffer diapedesis, or even rupture.

In fine, a hemorrhage often arises from some external mechanical cause in a person enjoying good health, though; strictly speaking, in both the last cases, the hemorrhage is not the disease itself, but only a dangerous symptom of the disease.

The prognosis of hemorrhages differs, according to the constitution of the body, the quantity and quality of the blood lost, and the greater or less diameter of the vessels affected. Thus, for instance, a hemorrhage arising from the degeneracy of the vessels is generally ominous, on account of the torpor of the vital principle, which always accompanies it. For the same reason the effusion of the blood depending upon atony is much to be feared; because, if the atony be not quickly remedied, the hemorrhage cannot be stopped, and life is destroyed: as is proved by a great number of lying-in women, who die of a flooding, arising from the atony of the womb after delivery. That, which owes its origin to plethora, is, in general, more easily cured, and often spontaneously ceases; yet it may prove mortal, at least Hildanus relates, that a vigorous young man, liable to a bleeding at the nose during many

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years,

years, at length suffered so great a hemorrhage from the nose, that he quickly died *. If, in fine, the hemorrhage be owing to an external injury, for instance, to a wound, the prognosis ought to be taken from the diameter of the wounded vessels; since, if the wounded artery be a principal trunk, and the more if it be in the vicinity of the heart, death, for the most part, quickly ensues from it's injury, on account of the quantity of the blood lost, though van Swieten relates an instance of a farmer, in whom the axillary artery was cut with a knife, and who still happily recovered *.

Hemorrhages are, to be treated differently according to their causes. In the plethoric, venesection, the antiphlogistic treatment, and a low spare diet, accomplish the cure. If the hemorrhage either arise from a spasm, or continue from this cause, opium, small doses of ipecacuanha, other antispasmodics, and blisters, are to be recommended. When the hemorrhage is produced by the degeneracy of the vessels, it is only a symptom of another disease, which is to be cured in a different way, according to the disease with which it is combined. If the hemorrhage be owing to some external injury, and thus there exists a wound at the same time, the vessels should be secured by ligature, styptics, or compression, and thus a stop put to the hemorrhage. Lastly, if the hemorrhage, arising from any internal cause, become dangerous by it's duration, and the

* G. F. Hildanus *Opera omnia Obs. Chirurg. cent. vi, obs. lxxii, p. 606. Frankfurti ad Mœnum. 1646, folio.*

† L. l. t. i, § 161, p. 235.

quantity of the blood lost, and thus the vital indication be urgent, astringents must be employed: the preparations of iron, especially the murias ferri, and alum, surpass the others: Cullen is of opinion, that the last of these proves the most powerful *: and my worthy preceptor, the celebrated Oosterdyk, professor of the practice of physic at Leyden, informed me, that he had stopped a hemorrhage of the womb by exhibiting alum, after having in vain tried the preparations of steel. The external application of astringents is sometimes usefully added to their internal use: cold water stands foremost among them: the tying of the extremities is an uncertain, and ambiguous remedy: Bennet already † observed, that the extremities are not unfrequently tied in vain; and, on the contrary, he almost always found it useful to solicit the blood towards the extremities by gentle friction, and perhaps friction may prove advantageous to the patients in some cases. If, in fine, the hemorrhage cannot be stopped, the vessels at last collapse for want of blood; the patient becomes extremely weak; the face, lips, nails, and, in short, the whole body grow pale; the pulse becomes fluttering and intermittent; the extremities are cold; sleepiness steals on; fainting ensues: the vital powers exert, for the last time, vain efforts to restore the disturbed equilibrium, slight convulsions of the limbs come on, and thus life is usually extinguished amid the very reaction of the system.

As to the second. The hemoptoe is a throwing up of blood from the lungs by the mouth. The

* L. I, § 1298.

† Bennet *Theatrum Tabidorum*, cap. xxv, p. 67.

disorder is usually preceded by dyspnœa, a sense of uneasiness or pain, and sometimes of heat in the breast, titillation of the fauces, a saltish taste in the mouth, a flushing of the cheeks, and a slight cough, which is succeeded by a throwing up of pure frothy florid blood. This disease is of frequent occurrence; at which, considering the great number of lung-vessels, and their very delicate structure, no one can be surpris'd. The different species of the hemoptoe, enumerated by nosologists, may, in my humble opinion, be properly reduced to the four following; viz. the habitual, the cacochymic, the periodical, and the accidental; which several species seem to me necessary to be distinguished, both because they are founded on the observations of nature, and each of them requires a somewhat different treatment.

1, *The habitual* is known by a bad formation of the thorax, a narrow chest, a long tender neck, the shoulder-blades extended in the manner of wings, a slender, delicate, and graceful appearance, a snow-white face, rosy cheeks, a vividness of the eyes, a fine genius, gayety of mind, and a delicate irritable fibre. Such persons, about their eighteenth year, some sooner, others later, according to the arrival of an accidental or exciting cause, fall into a hemoptysis, especially if an hereditary disposition be joined with the above symptoms.

2, *The cacochymic* arises from a certain morbid condition of the sanguiferous system. The hemoptysis arising from a scrofulous, scorbutic, and venereal, diathesis, and that which sometimes proceeds
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from the abuse of mercury, belong to this species.

3, *The accidental*, depending neither upon an hereditary taint of the lungs, nor upon the morbid state of the vessels, is produced from accidental causes.

4, *Periodical* is when a discharge of blood from the lungs, returning at intervals, acts, as it were, as a substitute for the absent or suppressed menses, or hemorrhoids.

The prognosis of hemoptysis is to be derived not only from the quantity of the blood discharged, but also from it's different cause and species. Thus the habitual is always ominous, for this generally happens from the eighteenth to the thirty-sixth year, often returning during this interval, after which it mostly terminates in an incurable phthisis. The cacochymic is, in most cases, not of a better prognosis, as being always attended with a morbid state of the sanguiferous system; for which reason, though a proper mode of treatment be pursued, yet it oftens returns, and not unfrequently brings on a consumption. On the contrary, the accidental and periodical forebode less danger, especially when they arise in an otherwise sound body from plethora, or from the suppression of a wonted discharge, and are oftentimes easily cured: though it is not to be denied, but that even these species of the hemoptysis always require to be treated with very great attention, both on account of the quantity of blood effused into the cellular texture of the lungs, and

the danger of a fresh paroxysm to be apprehended from the weakness communicated to the lung-vessels; and that they often prove destructive.

No general rules of cure can be prescribed in this disease, as each species requires different treatment. Thus, in the habitual, where a disposition of the blood to inflammation always exists, neither bark, steel, a milk diet, nor mineral waters agree. For what could these remedies effect? How could they stop a hemoptysis, occasioned by a local plethora of the lungs, arising from a bad conformation of the thorax, which necessarily must be increased by their use? Nay, the astringents and tonics are so far from preventing the approaching hemoptysis by strengthening the lungs; that, on the contrary, they rather produce a fresh paroxysm, by exciting an inflammatory state and orgasm of the blood, and soon bring on an incurable phthisis. Therefore these remedies ought to be laid aside in such cases; while this complaint, the radical cure of which is commonly beyond the power of the healing art, may at least be mitigated by small but frequent bleedings, an antiphlogistic regimen, and an abstemious and low diet; and by these means the hemoptysis may be prevented from changing into a pulmonary consumption. Stoll relates, that by this treatment he preserved a patient labouring under hemoptysis from a consumption for many years, till another physician was consulted, who asserting, that the lungs should be strengthened, soon precipitated the patient into an irremediable phthisis*.

* L. l. pt. 3, p. 10 & 11.

The cacochymic is cured both by the common remedies of other hemorrhages, and the particular medicines against each specific morbid condition of the sanguiferous system; though, in general, large and repeated bleedings are less useful in this species; and often, phlebotomy should be wholly omitted; whereas the demulcents, especially gum arabic, tragacanth, and the root of salep, joined with tonics, are often found of the utmost utility. The renowned Dr. Burserius was witness, that a young man, who laboured under a cacochymic hemoptysis, was perfectly restored, merely by a plentiful use of gum arabic, exhibited during a long time*.

The accidental hemoptysis requires various medicines, according to the different noxious stimulus; therefore if the hemoptysis arise from plethora, venesection, emulsions with nitre, whey, and gentle purgatives; in a word, the whole of the antiphlogistic plan is to be pursued. If the disorder be owing to a spasmodic affection, as sometimes happens to hysterical and hypochondriacal patients, having promised or omitted a bleeding, according to the circumstances, the cure is to be attempted by small doses of ipecacuanha, opium, blisters, applied either between the scapulæ, or to the breast: and if a bilious matter be the cause, then, omitting phlebotomy, which in such cases, according to the observations of Stoll †, is hurtful, an emetic must be given, by which, and the rest of the antibilious treatment, the hemoptysis will be cured. When occasioned by worms ‡, anthelmintics are to be employed. When

* L. l. t. iv, cap ii, p. 29.

† L. l. pt. ii, p. 73, & seq.

‡ *L. 7. Hafn*, vol. ii, cap. xxii, p. 315.

brought on by an external injury, the whole antiphlogistic plan should be carried into execution, in conjunction with other remedies suited to the various circumstances, and by no means neglecting venesection. If the hemoptysis be the consequence of the translocation of the rheumatism to the lungs, the disorder is to be removed by bleeding, opiates, diaphoretics, and the application of blisters between the shoulders or to the breast. In a word, in this species of the hemoptysis the cure must be accommodated to the nature of the irritating stimulus.

In the periodical hemoptysis, if the patient be in other respects in a pretty healthy state, no strong remedies ought to be used; as the person often becomes by degrees habituated to such a discharge, it is attended with less uneasiness, and may be protracted for many years without occasioning phthisis*. Accordingly the physician, having in vain attempted to restore the suppressed evacuations by gentle means, should commit the whole business to nature; as the suppressed evacuations are often difficult to be restored, and powerful remedies in these cases not unfrequently prove worse than the complaint itself. But when the hemoptoe attacks girls who have not yet menstruated, it is mostly the forerunner of the phthisis, as the accurate observer of this disorder, Bennet, has observed. Dr. Meza relates however a case of a girl, who, having not yet menstruated, was twice attacked with hemoptysis; but being afterwards married to a vigorous

* Bennet, l. l. cap. iv, p. 23; Van Swieten, l. l. t. iv, § 1298, p. 21; and *AA. Hafn.* l. l. p. 308 and 309.

young man, her menses occurred regularly, and she enjoyed perfect health *. But if the periodical hemoptysis be attended with dangerous symptoms, different medicines should be tried according to the circumstances.

Thus it appears, that it is less practicable to lay down certain rules for the cure of hemoptysis, than for that of most other diseases: how erroneous, therefore, is the opinion of those, who maintain that this disease ought always, either wholly or partly, to be cured by bark, preparations of iron, and the other tonics! as it is evident, that such medicines will injure by their stimulating power, in all cases where either an inflammatory disposition, or a plethora takes place. Though the exhibition of the bark and other tonics! after the hemoptoe has ceased, proves useful to fortify the lungs, and to guard against a relapse of the complaint, in all cases, where, to an inflammatory disposition and orgasm of the blood, a debility of the system and weakness of the lung vessels succeed; if, in any species whatever of the hemoptysis, the loss of blood be so great as to threaten death, the hemorrhage should be directly stopped. Accordingly the physician will have recourse to astringents: and these being tried in vain, he should administer cold water, which, when the indication is urgent, ought to be given every half hour as far as eight or ten ounces†. I readily allow, that the use of cold

* *Art. Hafn.* l. i. p. 307 and 308.

† *Burserius*, l. i. t. iv, cap. ii, § 39, p. 33 and 34.

water is not exempt from danger, as Quarin has observed, that the patients, to whom cold water was given, for the most part, died of phthisis*. What, however, is to be inferred from this? Certainly nothing more, than that cold water must be taken with caution, when the danger of death is not very imminent; but by no means, that it is never to be administered; for desperate remedies are to be employed in desperate cases, and it is better to try a hazardous medicine, than no medicine at all; and the trial of cold water is the rather to be made, as the greatest practitioners observe, that it is often productive of happy effects†.

Sometimes it happens in hemoptoe, that, after having tried repeated bleedings, and the strict antiphlogistic plan, the spitting of blood continues, is not to be stopped by astringents, and even resists cold water. In such circumstances the physician must have recourse to opium, joined with nitre; as the continuance of the hemoptoe in these cases mostly proceeds from the too great irritability of the patient, which is diminished by the use of opium. I have more than once seen a stop put to the disease by giving opium with nitre, when the astringents and cold water had been previously tried in vain. I would therefore advise, in all cases, in which the antiphlogistic treatment is ineffectual to put a stop to the hemoptoe, to give astringents blended with opiates previous to the use of cold water. For

* L. l. cap. iv, p. 62.

† Van Swieten, l. l. t. iv, § 1200, p. 40, & seq.; Burserius, l. l. & Meza *Act. Hafn.* vol. 3, p. 314.

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though I willingly grant, that in nearly all cases of hemoptysis, bleeding ought to precede the use of other remedies, and cannot be omitted with safety to the patient; yet I cannot help thinking, that, through deference to custom and authority, the antiphlogistic treatment is often carried too far, and we frequently bleed where we ought to administer opium and sedatives, with which astringents may be occasionally combined.

If, in fine, it be asked, what is to be thought of the riding on horseback, so recommended by Sydenham, both in hemoptysis and pulmonary consumption: I answer, that such a remedy perfectly agrees with the hypochondriacal complaints, and with the tabes mesenterica; as it is evident, that it must contribute a great deal to the cure of these diseases, by increasing the vital powers, and inciting all the functions. It may likewise prove useful even in the accidental and cacochymic hemoptysis, if the disorder were brought on by such causes, as can be remedied by increasing the motion of the blood, and by inciting the vital principle; but in all other cases, riding on horseback is not merely useless, but besides often provokes a fresh paroxysm, and accelerates the death of the patient, by inciting the orgasm of the blood.

Morgagni, Stoll, and Quarin coincide with me in opinion, and prove by many instances, that this mode of treatment frequently brings on death*.

* Morgagni, l. l. t. i, lib. ii, epist. xxii, art. 15; Stoll, *Rat. Med.* pt. i, sect. ix, p. 130 and 131; and Quarin, l. l. cap. v, p. 103 and 104.

Indeed I have known several patients fall victims to this doctrine. When a patient dies of hemoptysis, he is either carried off by a copious effusion of blood from the lungs, in consequence of which the heart, deprived of the due quantity of blood, ceases to act; or suffocated by the too great quantity of blood accumulated in the vesicles of the lungs, and in their cellular texture. Thus he dies either by a suffocation or a fainting; of the manner of killing of both which I have spoken above.

CLASS X.

DEATH FROM CACHEXIES.

IN the cachexies, the habit undergoes a certain change from the healthy state without any idiopathic pyrexia. It ought farther to be observed, that, in the diseases belonging to this class, the animal functions appear to go on very well, and are not injured except in the progress of the disorder, on account of the daily increasing debility of the system. The cachexies may be divided into three orders, according to their manner of operating on the body: ulcers; atrophies; inabilities and privations. But before I proceed to examine them particularly, something is to be said of the hectic fever, which not unfrequently accompanies diseases of each order of this class.

The hectic fever is to be counted among the various subjects of physic, the notion of which remains hitherto vague and indeterminate; because this fever, merely symptomatic, is attended with different symptoms, in various cases, which have been looked upon as so many varieties of it by the writers on the subject. Hence different descriptions of this fever are met with in various authors. Most practitioners, continually afraid of the acrimony of the humours, maintain, that a peculiar noxious acrimony is the cause of this fever; and even very eminent physicians dispute very warmly on the nature of this acrimony.

mony. Some attribute this disorder to an alkaline, others to a rancid or putrid, and some again to an ammoniacal acrimony of the humours, and perhaps all with equal justice. Omitting, for brevity sake, all animadversion on this theory of acrimonies, I say only, that the fluids of the animal body scarcely ever show the least qualities of an acid or alkali, either in the hectic fever, or in any other complaint commonly ascribed to acrimony of the humours; that this fever is never produced from acrimony itself; and, in fine, that the morbid condition of the blood greatly differs in this fever, according to the difference of the noxious stimulus. This I shall endeavour to demonstrate, after enumerating the opinions of some modern physicians on the hectic.

Cullen, who treats the best of all on this fever, says, that it daily returns with paroxysms at noon and evening; with a remission, seldom an apyrexia, in the morning; and is generally attended with night sweats, and urine depositing a furfuraceous brick-coloured sediment. He is farther of opinion, that this fever ought always to be ascribed to the absorption of an ichorous matter*. Macbride asserts, that the hectic is a product of a peculiar acrimony; and that it differs from the other fevers in this, that the morbid matter is either subdued, or discharged from the body by the *vis vitæ* in the latter, whereas so salutiferous an event is never to be expected in the former; and as thus but little or no help in this disease is to be expected from the

* L. l. vol. ii, book iv, sect, i, § 861, p. 69, and *Synopsis Nosolog. method*, p. 80 and 81.

natura medicatrix, the whole cure is to be looked for from the power of phyfic *.

Although thus Cullen and Macbride, with whose opinion the moderns, as well as the ancients, for the most part agree, suppose an acrimony of the fluids requisite to the existence of the hectic; yet it seems to me evident from the noxious powers bringing on this disease, that it often arises without the least acrimony of the fluids, and that their altered condition, if not always, at least in most cases, is rather to be looked upon as an effect of the hectic fever, than as it's cause. For, in the first place, the hectic arises from a morbid state either of the sanguiferous or lymphatic system: as is the case in a venereal, scorbutic, and scrofulous hectic. It is indeed true, that the crasis of the humours is always altered from the healthy state in these cases; but that the origin of the hectic is not to be derived from their disorder, is evident from this, that the scrofulous, the scorbutic, and even the cancerous acrimony, certainly the worst of all, often exist during a long time without the least mark of a hectic fever. The same happens in syphilis, where, as is well known, the venereal poison has been already absorbed for a long time, before this fever appears, which clearly proves, that the hectic is not occasioned by an absorbed morbid matter, but by the alteration of the solids themselves, brought on by the noxious stimulus.

Secondly, it is brought on by a local disorder of some organ, that is, it derives it's origin from

* L. I. chapter xviii, p. 115 and 116.

causes, in which no acrimony of the fluids can possibly exist; for this fever sometimes proceeds from different stimuli operating too violently on a body otherwise sound; such as worms and stones, and it is not unfrequently produced by tubercles of the lungs, the degeneration of the glands of the mesentery, scirrhuses of the viscera, &c. Now how can an ichorous humour be absorbed in the scirrhus of the viscera, in which the whole organic composition is often destroyed? In what way can an acrimony of the fluids be produced by these scirrhuses, by worms, stones, &c., unless merely from this, that, either by the suppression of some function, or by the noxious stimuli operating too violently, such an action is impressed on the solids, as always occasions a morbid condition of the fluids? This, which is sufficiently demonstrated by sound reasoning, is besides confirmed by the observations of practitioners, not only when the hectic fever is brought on by the above causes, but also, when it is the consequence of the phthisis itself, the blood drawn out of a vein, in the commencement of the disease, is almost always found in it's natural state, and not the least disorder of the fluids exists, which is only observed towards the end of the disease, when all the symptoms grow worse: an evident sign, that the commonly called acrimonies are nothing but the effects of the depraved manner of acting of the solids. Hence when the hectic arises from worms or stones, if the noxious stimulus be happily removed at the commencement, the former health is directly restored, and no disorder of the fluids appears. What else can now be concluded from all this, than that the hectic is engendered by some morbid stimulus

lus operating in a certain and determined manner on the solids, and that no acrimony of the fluids is requisite to it's existence? As every noxious power, when violently and continually stimulating the system, must necessarily bring on a debility, and a certain degeneracy of the solids, with which a feverish motion, called a hectic fever, is soon joined. Thus the hectic fever differs from the other fevers only in it's degree, and the reason why it is not determined by a happy crisis like the others, is only this, that the morbid cause in general cannot be vanquished by the solids, on account of the alteration they have undergone in their structure, therefore all other fevers change into hectic, as soon as the requisite degeneracy of the solids takes place. For the rest, the hectic fever, like all others, is nothing but a salutiferous struggle of the vital principle; which however is prevented from having the desired effect, either by the degeneracy of some organ, or by the weakness of the system: for the solids, continually excited by the morbid stimulus, run into irregular and inordinate motions, by which they in vain endeavour to remedy the cause of the disorder, because it is either absolutely not to be removed, or it's expulsion is so difficult, that the enfeebled *vis vitæ* is inadequate to it's accomplishment; on the contrary, the organs become daily more and more weakened, and all the symptoms grow worse by the very reaction of the vital powers.

Let it not be argued, that this fever cannot be considered as a salutiferous effort of nature, since it's symptoms manifest themselves the more, the

nearer the patient approaches to death; as the same is not seldom observed in many other diseases. For instance, analogous symptoms often arise in a slow nervous fever, in which, especially at the end, the utmost torpor of the vital principle takes place; and when the patients expire in this fever amid convulsions, as sometimes happens, are these irregular motions to be imputed to the excess of the vital powers? Are the most horrible convulsions, with which the wretched patients, who labour under hydrophobia, are continually agitated, to be ascribed to the vigour of their vital principle? Is it not, on the contrary, evident, that all this is to be explained from the immoderate and irregular reaction of the solids consequent to the morbid stimulus? The above objection therefore is of no weight, for it is founded on the false hypothesis, that irregular and immoderate motions always originate from the excess of the vital principle; whereas the above instances show that these often arise from the violently irritating morbid stimulus, even when the vital principle is languid.

It is quite sufficient to have observed this in general on the nature of the hectic, so far as to give an idea of the diseases, with which it is often accompanied; for the rest nothing positive can be advanced of the hectic; since, as it is only a symptom of another disease, it differs according to the nature of the distemper, with which it is combined.

O R D E R I.

Ulcers.

G E N U S I.

Phthisis.

THE phthisis is a wasting of the body, occasioned by an ulcer of any internal organ. Thus phthisis is a general name consistent with all consumptions, occasioned by an ulcer in any internal organ of the body: for as experience teaches, that ulcers may occur in almost all the internal organs, it follows, that there exist as many species of phthisis, as there are organs, the ulcers of which may occasion the wasting of the whole body. Thus we find mention of the phthisis of the brain, of the wind-pipe, of the lungs, of the pleura, of the heart, of the cawl, of the peritoneum, of the mesentery, of the stomach, of the intestines, of the liver, of the gall-bladder, of the spleen, of the pancreas, of the kidneys, of the bladder, and of the womb*. It is not my intention seperately to treat of all these kinds of phthisis, as it suffices for my purpose to lay down a general description of this dreadful malady; therefore, by way of an example, I shall treat of the phthisis

* S. G. Vogel, l. l. t. iv. kap. i, p. 14 & 15, kap. xi, p. 278, kap. xii, p. 288, and kap. xxiii, p. 423: Storck. *Ann. med. sec.* p. 151 & 153. R. Vogel, § 213, p. 165 & § 234, p. 183: Selle *Rudim. Pyretol.* p. 297: and Tulpus *Obs. Med.* lib. iv, cap. xxiii, p. 328 & seq.

of the lungs, as it is more frequently met with than the others, the species, prognosis, cure, complications, and consequent manner of destroying of which I shall particularly notice.

Authors treating of the phthisis of the lungs comprise, in general, under it's name many other diseases, in which no exulceration of the lungs takes place; and which thus, by no means, belong to this distemper, but ought rather to be ranked among the species of tabes. It appears to me indispensable, to take notice of this error: as it seems to be in a great measure owing to this that the most eminent physicians prescribe such remedies in this disease, as, if given in a real pulmonary consumption, of which alone I here treat, would not merely prove useless, but even accelerate the death of the patient. The three following species ought to be distinguished in the real phthisis.

1, *Phthisis from a hemoptysis.* This principally arises from the habitual, and the cacochymic hemoptysis: for the other species of this complaint do not change into a pulmonary consumption, except under certain circumstances.

2, *Phthisis from an acute inflammation.* This it is, which sometimes succeeds to the peripneumony.

3, *Phthisis from a chronical inflammation, or the tuberculous.* This is the most frequent. It arises, for the most part, in scrofulous subjects, as is proved by the external appearance of the body; by the tumour of the lymphatic glands in the other parts, which

which is often observed together with this phthisis; and in fine, by the frequent complication of this complaint with the tabes of the mesentery, which is evidently of a scrofulous origin*. The illustrious Mead, after asserting, that such persons are the most liable to the exulcerations of the lungs, who had laboured under scrofula in their youth, observes that, according to the observations of Dr. Radcliffe, the phthisis in our colder regions is mostly of a scrofulous nature; and that the lungs are often found choked with tubercles, or indurated glands, in the bodies of persons carried off by the pulmonary consumption†.

As however there is no glandular structure in the cellular connecting membrane of the lungs, these tubercles cannot be a morbid affection of the lymphatic glands. The ingenious Dr. Baillie is of opinion, that they are produced by an extravasation of coagulable lymph into their substance during a previous attack of inflammation‡, which opinion has been confirmed by Mr. Ashley Cooper by many preparations of such bodies. This phthisis is sometimes produced by an induration of the blood-vessels§: for, if any portion of the lungs become indurated, either from a peripneumony not radically

* Cullen, § 839. p. 385.

† *Monit. et Precept. Med.* p. 46.

‡ See his excellent Work intituled, *The Morbid Anatomy of the Human Body*, p. 66.

§ Cullen, l. l. § 856, p. 383: Stoll, *Rat. Med.* part i, de Pleuritide occulta sive latente, p. 71 et seq.: Burserius, l. l. t. iv, cap. iii, p. 48 et 51.

cured, or from a previous hemoptysis, the same happens in the lungs, that we daily observe in the external parts of the body in boils not well suppurated: namely, that part of the boil, which has not undergone suppuration, though it often remains indurated during a long time, always retains a great propensity to a fresh inflammation, so that any occasional cause arising long after, the boil again inflames, and a suppuration is induced. In the same way this takes place in the tubercles of the lungs. In their commencement such tubercles also do not excite the least pain; nevertheless afterwards, especially if any exciting cause occur, they are seized with a chronical inflammation, which, proceeding slowly, at length terminates in a suppuration, and produces many small abscesses.

The chief symptoms of this distemper are emaciation and debility, attended with cough, peevishness of temper, hectic fever, colliquative sweats, purulent expectoration, and diarrhœa. It ought however to be remarked, that, beside these as it were characteristic symptoms of the phthisis pulmonalis, many other symptoms are frequently met with in the consumption of the lungs; but which vary according to the different species of the disorder, and the various constitutions of the patients.

The prognosis of this disease is always ominous, and for the most part, sooner or later, it leads to death. The reason of this event is nevertheless not to be imputed to the flaccid structure of the lungs, to their continual motion, and to the exposition of the ulcer to the atmospherical air, as is commonly be-
lieved.

lieved. For these, though they really retard, and sometimes impede the cure, are not sufficient to explain it's fatal event: since all these circumstances exist in every ulcer of the lungs, and yet phthisis from a peripneumony is more seldom met with in these countries than the other species; and if the inflammation of the lungs change into a suppuration, nevertheless, the vomica being broken, there is often discharged a very good purulent matter, and the ulcer soon consolidates. It is farther to be observed, that, though the consequence of a hemoptysis be a suppuration of the lungs, still this disorder is sometimes soon cured; and that, if the body be in other respects sound, and the patient have no predisposition to the consumption, a phthisis scarcely ever arises from the accidental or periodical hemoptysis *. Therefore the prognosis of phthisis, is, in my humble opinion, rather to be taken from the different species, and from the cause which brings on this disorder. The stage of the phthisis, too, ought always to be considered: for all the cases, which are related, of the cure of persons who had laboured under phthisis for some years, and even as many as twenty, belong without doubt, to a certain species of tabes, and by no means to a true excoriation of the lungs; for, who can still entertain hopes of a cure, when the lungs are, for the greater part, consumed by suppuration? Indeed as long as physicians are unacquainted with the art of inciting nature to motions, which, with a certain plastic tendency as it were, might regenerate new lungs instead of the wasted ones, so long will no patient

* Cullen, l. 1. § 364, p. 371, and § 298, p. 400: et Vogel, *Prælect. Acad.* § 271, p. 210.

ever be recovered from a confirmed phthisis: nay, though practitioners had discovered this art, all that labour under confirmed phthisis would still be carried off; as the organs of the human body are able to sustain irregular and immoderate motions only to a certain degree, without unavoidable loss of life. Consequently, if the irregular motions be extended beyond this degree, not the least hope of cure remains, and the vital principle is gradually extinguished. This is not only true with regard to phthisis, but also with respect to all other diseases; and though the degree of morbid alteration of the solids that proves mortal in these distempers cannot always be previously determined, but differs according to the constitution; still there exists a certain degree mortal to every person. Thus, for instance, Haller notes in his Elements of Physiology, that he had observed no patient recover, in whom, in any fever, the pulse was more than a hundred and forty in the space of a minute, but all such died. I readily agree, therefore, with Cullen, that no one is ever recovered from a certain degree of consumption, attended with colliquative sweats, and diarrhœa.

Thus in the last stage of the pulmonary consumption, the radical cure is beyond the power of physic: in the other stages, there appears greater or less probability of recovery, according to the species of the disease, it's cause, and the constitution of the patient. For instance, if a phthisis arising from a peripneumony attack a strong person, and it be properly treated in it's commencement, it is more easily cured than the other species, as is proved by
many

many instances of patients restored from it *. Great hopes, likewise, may be entertained in phthisis from hemoptysis, except it be of the habitual or cacochymic species: for, if the phthisis derive it's origin from habitual hemoptysis, the prognosis is by no means equally favourable; as in such cases the phthisis proves generally incurable, because the physician cannot remove the bad confirmation of the thorax, which is the cause of this phthisis: nevertheless, we need not then entirely despair of a cure; for sometimes, the plethora of the lung-vessels being continually kept off by proper treatment, these vessels being rendered stronger by age, and the cause of the phthisis being thus removed, the phthisis itself is cured; of which Dr. Bennet records several instances †. But if an hereditary disposition to phthisis accompany the habitual hemoptysis, then the distemper, according to the observations of Dr. Bennet, proves incurable: for he says, that “ those, who have received an indelible impression from their parents, are incurable, though they protract life longer than others ‡.” Exceptions to this rule exist, however, as van Swieten relates, that a young man, who was attacked with phthisis from habitual hemoptysis, and in whom this disorder was hereditary, was cured by Boerhaave §. The same author mentions some other instances, proving, that sometimes this complaint, even when hereditary, may be vanquished by a proper treatment. Lastly, if the phthisis arise from a cacochymic hemop-

* Van Swieten, l. l. t. iv, § 1206, p. 63: Burserius, l. l. t. iv, cap. iii, p. 61: and Cullen, § 898, p. 401.

† L. l. p. 101. ‡ L. l. p. 99. § L. l. t. iv, § 1207, p. 80.
tylis,

tyfis, it commonly brings on death, on account of the weakness of the general system: the prognosis is nevertheless different, according to the different disease with which the phthisis is then accompanied. The prognosis of a phthisis from a chronic inflammation, or from a tuberculous one, is very ominous, as this most dangerous species of the phthisis commonly bids defiance to all the remedies in the power of physic, and has usually a fatal termination. The reason, why the tuberculous phthisis so often proves fatal, is, because this phthisis is always produced from an inflammation of the scrofulous tubercles, or of the indurated veins.

Now how difficult it must be to cure this in such delicate organs, and so remote from the operation of medicines, needs no demonstration: especially as very often all these tubercles are not seized with the inflammation at the same time, but one after another, so that both an inflammation and a suppuration take place in the lungs at once; to reconcile the indications of which is by no means easy. Beside these reasons, there exists still another of no less weight; namely, that when the ulcerating process has been allowed to go on in these tubercles during some time, the intermediate substance of the lungs generally becomes much firmer, and undergoes a certain degree of induration; the blood-vessels round the boundaries of these small abscesses are very much contracted, and the air cells in a great measure obliterated; the lungs suffer thus a degeneracy of their organic composition. Now who can hope radically to cure the disease, after it has produced such a considerable alteration in the organism

ism of the lungs? This species of phthisis, therefore, though difficult, in general, to be removed, may still be cured in it's commencement; but when the complaint has already continued for a long time, it becomes incurable.

As it is demonstrated by sound reasoning, that the tuberculous phthisis, especially in a late period, must generally prove fatal, so it is likewise confirmed by the observations of practitioners. Mead says, that an imposthume of the lungs, though a serious complaint, and often terminating in a consumption, is notwithstanding attended with less danger, than these small exulcerations *. Cullen declares them to be very dangerous, and almost always mortal, when an hereditary predisposition is united with them †. Burserius observes, that this phthisis is the worst of all ‡: and much confirming this may be found in van Swieten §, who not only agrees with the rest in this matter, but also relates many observations and dissections of such bodies, all which corroborate what I have said above on the tuberculous phthisis.

The indications of cure requisite in every phthisis are the three following:

1, To abate the inflammation.

* *Monit. & Præcept. Med.* p. 53.

† *L. l. § 898*, p. 40r.

‡ *L. l. t. iv, cap. iii*, p. 61.

§ *L. l. t. iv, § 1205*, p. 59 et seq.

2, To

2, To avert all causes, which may irritate the lungs.

3, To change the exulceration of the lungs into a simple ulcer, and thus to promote it's consolidation by the *natura mediatric*.

These indications, though to be observed in every species of phthisis, are yet not to be answered in the same manner, and with the same remedies, in all. It is necessary, therefore, to treat separately of each.

1, *Phthisis from hemoptysis*. The pulmonary consumption from habitual hemoptysis is to be cured with the same remedies, by which the transition of the hemoptysis into phthisis was to have been prevented. For as a propensity of the blood to an inflammatory state, with a certain species of plethora, arising from a bad conformation of the thorax, always exists in this phthisis; sound reason dictates, that whatever incites either the orgasm, or inflammation of the blood, ought to be avoided with the greatest care. Thus alum, steel, -elixir vitrioli, oxymel scilliticum, Iceland liverwort, bark, myrrh, polygala amara, and rattlesnake-root, should be omitted in these cases. The same may be said of the milk diet. Indeed what can stimulants, astringents, and tonics, effect here? or with what view can milk be given to such patients? In reality all these must from their nature again excite hemoptysis, and quickly render this phthisis mortal, by increasing the quantity and orgasm of the blood, and by inciting the inflammation,
and

and fever. The emollient, oily, mucilaginous, and demulcent medicines are likewise found to be of no utility : for these were prescribed by the ancient practitioners, to temper an acrimony of the fluids, which by no means exists. Nay even in all other pulmonary consumptions these medicines ought to be cautiously given, because, though they mitigate the cough, they by no means act on it's cause; but, on the contrary, often increase the complaint by producing too great a relaxation of the lungs. Besides, they extremely weaken the tone of the *primæ viæ*, so that, while you provide for the lungs, the alimentary canal is frequently reduced to need help. In fine, though I have seen them frequently employed, yet I never observed any permanent relief from their use; and even, by their disturbing the function of the stomach, the hectic fever is not unfrequently increased. Dr. Bennet therefore justly observes, that though it is a general custom to calm the cough by demulcents, yet you must be cautious, lest the root itself increase, amid the defalcation of the branches; for that such medicines often occasion more injury than benefit, and that he has observed many disorders from their abuse*. Whereas small, but repeated bleedings, the use of the juice of cucumbers†, a low and abstemious diet, and the avoiding of all violent exercise and motion, are proper; for by these the patients are either radically cured, or, at least, always experience much relief, and are preserved alive during many years. I have seen a remarkable instance of it in one of

* L. l. cap. xxvii, p. 69 & seq.

† Murray, l. l. t. i, p. 58 et seq.

my relations, who is a physician himself. At the age of twenty four he laboured under a phthisis pulmonalis, brought on by habitual hemoptysis; yet by making use of the prescribed treatment he not only kept himself alive; but the plethora of the lungs gradually diminishing, and the lung-vessels being rendered stronger by age, he gradually amended, and lives now in a pretty healthy state, being at present about fifty two years old. It ought however to be observed, that much skill and management of the practitioner is required in the treatment of this complaint; as it is a matter of indifference to the patient whether he be killed by the attempt at strengthening the lungs by tonics, or by using the lancet. The antiphlogistic regimen is doubtless often carried too far; for the irritable and delicate constitution of such patients cannot bear either the loss of any considerable quantity of blood, or the superabundance of it. Besides, it ought always to be kept in mind, that such patients do not labour under an universal plethora, but only under a local one of the lung-vessels. Let the patient, therefore, carefully avoid all but moderate exercise and motion; keep him low by a cooling and acescent regimen, by the use of the juice of cucumbers and of fruits of all kinds, and by the rendering the body open by gentle purgatives; draw also occasionally blood from time to time, but be on your guard not to take it away in large quantities, otherwise instead of good you will do a great deal of mischief; and as the patient becomes advanced in age, the blood is gradually more and more sparingly to be drawn, and the intervals between the bleedings ought to be longer.

In phthisis occasioned by the other species of hemoptoe, the cure wholly depends on the symptoms, so that when the inflammatory disposition prevails, the antiphlogistic regimen ought to be pursued: if, on the contrary, the inflammatory disposition be removed, and the system, as is generally the case, appear to be debilitated, the bark, steel, myrrh, and bitters, are to be given, in order to strengthen the lungs, and to furnish nature with sufficient power to heal up the ulcer.

2, *Phthisis from peripneumony.* In the first stage of this phthisis the antiphlogistic regimen ought likewise to be adopted. As, nevertheless, the inflammation of the parts bordering upon the ulcer is generally much less in this species, than in the former, the first stage often soon passes over, and the inflammation of the neighbouring parts being wholly removed, the pulse is frequently found weak, and soft, the vital powers are enfeebled, and the patient expectorates a great quantity of fetid matter. Under such circumstances, the bark, steel, and myrrh, are to be employed; with which, according to the symptoms, the elixir vitrioli, and various other medicines may be joined, by the use of which the tone of the parts is often restored, the expectoration confined within certain bounds, and the ulcer cleansed. The polygala amara, the rattlesnake-root, and the Iceland liverwort, may also be useful in such cases. These medicines however seldom agree in a true pulmonary consumption, at least I have never observed any good effects from the first or second; and as to the Iceland liverwort, though it sometimes afforded relief, yet it was

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never

never found capable of performing a radical cure. The medicines I have seen used with advantage are the bark, steel, and myrrh, the last given from ℥ii to ℥ii during twenty four hours.

In this phthisis cases sometimes occur, in which the physician ought to have recourse to the tonics from the commencement of the disease; namely, when the exulceration of the lungs attacks weak, flaccid subjects, not inclined of themselves to an inflammation. The constitution of such patients is often soon broken, the pulse is found to be very weak, and ichor is secreted instead of a good purulent matter. If in such a case the antiphlogistic treatment were still continued, it is to be feared, that the patient would die under the very operation of bleeding. Here, therefore, where the vital powers languish, the tonics are to be administered, for the purpose of increasing the tone of the vessels, and changing the ichor into a good purulent matter.

The practitioner ought however to begin with the exhibition of the tonics in small doses, and in conjunction with remedies diminishing the hectic fever; such as the sarsaparilla, and the dulcamara; and afterwards, when the patient is accustomed to these, he should proceed by degrees to large doses, as otherwise it is to be feared, that a fresh inflammatory state of the ulcer might be excited by the tonics themselves. This I have frequently observed to be the consequence of an imprudent administration of tonics in too large doses; for the irritability of phthisical patients is in general so great, that

I have sometimes seen, even in cases of hectic attended with early debility and little apparent inflammation, that by the use of tonics the pulse became quicker and hard, the cough more severe and dry, the respiration more difficult, and the expectoration suppressed. My worthy friend Dr. Oosterdyk, professor of the practice of physic at the university of Leyden, and several other eminent physicians of Holland, assured me, that they had frequently witnessed the same phenomena in phthisis, after giving the bark.

Sometimes it happens, that in these cases the expectoration becomes suppressed by the languor of the solids; especially in cold indolent temperaments, of a lax fibre. Stronger stimulants are then required, such as sulphur aurat. antim., kermes minérale, and oxym. scillit., in order to promote the expectoration.

In cases in which a large quantity of matter is discharged by expectoration, and the patients experience an almost continual coughing, in order to delay the irritation brought on by the severe cough, and to promote the healing up of the ulcer by clearing it from the secreted pus, nothing proves more salutary, than an emetic, given in the evening every other day; which effectually clears the ulcer of its contents; and, by taking off the irritation; acts as a sedative and prevents in a great measure the cough, thus greatly promoting the consolidation of the ulcer.

3. *Tuberculous Phthisis.* The practitioner ought, in this phthisis, to attempt to resolve the inflamed tubercles by small and repeated bleedings, suited to the constitution of the patient, and the degree of inflammation; by keeping the body open; and by the antiphlogistic regimen. The inflammatory state being removed by these means, recourse is to be had to tonics; which, however, at the commencement, ought to be given but in a small dose, and combined with aperients: for I have found by experience, that the ulcers not unfrequently become inflamed again, in consequence of an opposite mode of proceeding. By degrees the dose of the tonics is to be increased, till at length they alone accomplish the cure; and, by strengthening the lungs, they prevent these organs from being afterwards so susceptible of being affected by catarrh and inflammation. The tonics from which I have observed the greatest benefit, are myrrh, steel, bark, and bitters. I do not speak of the milk diet, as I have found, that those, who labour under this phthisis, cannot bear milk, and the hectic fever is exasperated by it's use. Vomits are strongly recommended by some moderns, especially in this species of phthisis. Now from what I have said before of their use, it is evident, that they may be employed with great benefit to the patients under two circumstances. First, when given before the inflammation of the tubercles takes place, they often prevent the phthisis from coming on: for emetics are frequently found to be a very powerful remedy for the dispersion of the tubercles, while they are as it were still quite crude. Secondly, when the inflammatory state of the tubercles is nearly removed, little heat and inflammation remain

remain, and the system appears to be weakened, we may join with tonics the administration of emetics at night; not only with safety to the patient; but with considerable advantage in the cure of the complaint, by their cleansing the ulcer, and removing the irritation brought on by the continual coughing. It appears then, that vomits prove salutary in this species of the pulmonary consumption both previous to the inflaming of the tubercles, and after their inflammation has been removed: on the contrary, in the early stage of this disease, when the tubercles are in an inflamed state, when there is much fever, heat, and inflammation, it is sufficiently evident, that, as these circumstances require all irritation of the system to be carefully avoided, vomits, by the shock they give the whole body, cannot but do mischief.

Other practitioners from the commencement of the disease use tonics, especially the bark and myrrh, in large doses, in conjunction with an animal diet. But though I willingly allow, that the efficacy of the bark in scrofulous disorders is beyond all doubt; though I am perfectly satisfied, that, the inflammatory state of the ulcers being removed, myrrh has a considerable share in healing them; though, in short, I grant, that the inflammation of these tubercles, being chronic, does not in general require such copious and repeated bleedings as an acute one; and that, after the inflammatory state has subsided, tonics ought always to be given to accomplish the cure of the complaint, and to prevent any relapse by strengthening the lungs: yet such a practice seems to me to be rash and irrational, and cannot

but in general prove hurtful and fatal. For if we consider the tender and delicate structure of the lungs, so liable to become inflamed, and the violent stimulus that must be communicated to the inflamed lungs by such remedies, the natural inference is, that such medicines are highly injurious in the inflammatory stage of the pulmonary consumption; the more as experience teaches us, that persons having laboured under scrofula in their youth, afterwards live in a pretty healthy state for many years, till at length, from the accession of the exciting cause, the dormant complaint manifests itself; that is, the crude tubercles become inflamed, the inflammation changes into the ulcerating process, and thus gives rise to the tuberculous phthisis. Now it is well known, that stimulating remedies prove a very powerful exciting cause of the inflammation of the crude tubercles; how then, is it to be believed, that remedies, which by their stimulating quality would even bring on a tuberculous phthisis, can be useful in the inflammatory stage of the disorder? Does it not naturally follow, that, on the contrary, such remedies must inflame the neighbouring parts; instead of subduing the inflammatory state of the ulcers? This is the more evident, as we daily see, that phthisical patients, though already convalescent, by not observing the precepts of the physician who attends them, as is unluckily too often the case, and imprudently exposing themselves to foggy weather, again become much worse, even by a slight catarrh. Though, therefore, myrrh, bark, bitters, and steel, prove useful in cases attended with little heat and inflammation, yet in the first stage of the phthisis such remedies ought to be entirely omitted.

And

And even in cases of early debility, tonics are in the commencement to be exhibited but in a small dose; as when imprudently used directly in a large quantity, far from being of real service to the patients, they frequently again excite a fresh inflammation.

Now what is evident from sound reasoning of the hurtful effects of the tonics in the commencement of this disease is likewise confirmed by the observations of practitioners. It will be sufficient here to adduce the words of one of the most eminent physicians of this century: who says, " I have seen the bark given in almost every state of the *phthisis pulmonalis*, even in the first commencement, whilst the breast was in pain, the cough dry and harsh, the pulse quick, and hard, and the heat considerable. What was the consequence? frequently an hemoptysis, and all it's worst attendants, ulcerated lungs, purulent spitting, colliquation, and death *." But if the bark, on account of it's stimulating power, be injurious in the early stage of the disease, how much more carefully ought not the use of steel and myrrh to be avoided? I could produce many instances of the detriment they have occasioned, when imprudently exhibited under such circumstances, were not sound reasoning alone quite sufficient to prove, that they cannot fail to be productive of bad effects.

But if the phthisis no longer admit of cure, on account of the alteration in the structure of the lungs, or of the advanced stage of the disease, the patient is

* Fothergill *Med. Obs. and Inq.* vol. v, art. xxxiii, p. 348.

not to be abandoned to his fate: for, though the distemper proves incurable in such cases, the art of physic can furnish many succours, by which the complaint may be alleviated, and life protracted for a long time. For this purpose different medicines ought to be employed, according to the circumstances: thus, if the patient still enjoy sufficient strength, and there exist marks of an inflammatory state of the tubercles, every thing that is capable of abating inflammation proves salutary: so that small but frequent bleedings, the antiphlogistic regimen, the juice of cucumbers, a low and abstemious diet, and whey, on account of it's slightly nutritious, aperient, and antiphlogistic virtues, are found to be of great utility. Whereas, if the symptoms of inflammation be wanting, and a general decay of all the powers be observable, the above remedies would prove mortal; and in such circumstances, tonics, especially the bark, steel, and myrrh, ought to be given; as the benefit of such remedies in these cases is demonstrated by the observations of practitioners, of whom it will suffice to adduce Quarin and Morton alone. The former of these physicians records, that a decoction of the bark had always proved useful in the above circumstances*; and these are the words of the latter, “ I have very often experienced the efficacy of
 “ the bark when frequently and repeatedly taken
 “ at due intervals, for suppressing the feverish pa-
 “ roxysms, at least for some time, so that I have seen
 “ some phthical patients already given over, who
 “ protracted life by it's use not only during many
 “ months, but even for some years; and who, though

* L. 1. cap. 3.

“ not radically cured, were nevertheless delivered
 “ from the fever by it's use, and could go through
 “ their daily occupations with tolerable ease *.”

What is here asserted with respect to the bark holds also good with regard to the myrrh and steel, from which remedies I have observed much benefit in such cases: and even by the lichen Islandicum, though inferiour to the efficacy of the above remedies, I have sometimes seen patients very much relieved.

With respect to the regimen of the patients in this complaint, upon which the cure in a great measure depends, in the early stage of the disease the coolest and most acescent diet ought to be prescribed; meat is not to be given, except in a small proportion; wine, spirits, and all kinds of stimulating food and drink ought to be forbidden; on the contrary, in a more advanced period of the disorder, when the inflammation is subsided, such a regimen would do mischief: for in all cases of debility, where we recommended the use of tonics, the patient is to be indulged in the use of animal food, and of wine in a moderate quantity, which, far from being injurious, have a considerable share in the removal of the complaint. As all irritation of the lungs proves hurtful, and as the perspirable fluid, when retained in the body, is frequently conveyed to the weak lungs, and excites a fresh inflammation, the greatest care ought to be taken, both that the patients continually enjoy a moderate degree of perspiration, and that the quan-

* *Phthisiol.* lib. 2, cap. 10, p. 101 & 102,

tity of blood flowing towards the lungs be diminished by soliciting it towards the surface; which indications are best answered by avoiding cold, by wearing flannel under-waistcoats, and by moderate exercise.

I have not mentioned milk among the remedies useful in this disease, as reasons are not wanting which forbid it's use in the real pulmonary consumption: for milk proves injurious in all cases, where an inflammatory state exists, on account of it's caseous part. It is likewise so far from being suitable in the tuberculous phthisis, that I have often seen the complaint increased by it. And in other cases, when the inflammation is wholly removed, the enfeebled organs of digestion are generally unable to convert it into a proper chyle: so that milk, corrupted in the stomach, not only fails of the desired effect, but besides often produces many disorders in the *primæ viæ*. Hence, though I readily admit, that milk sometimes greatly contributes both to prevent the phthisis, and to strengthen the body when the distemper is already cured, yet I think, it is better to give it's whey in the phthisis itself. Nay even the father of physic was conscious, that milk was not advantageous in the real phthisis. For though he recommends the use of milk to the consumptive *, yet he adds so many cautions, and records so many symptoms, which forbid it's use, that, if milk be to be given to the tabid, according to the rules laid down by the venerable Hippocrates, it in fact ought never to be used in a real pulmonary consumption; for it would not be

* Aphorif. sect. v, aphorif. 64.

easy to find a phthifical patient, in whom either one or other of the symptoms forbidding it's use is not to be observed. It is evident, therefore, that this most respectable author condemned the use of milk in a real phthifis; and his authority is of the more weight, as it is certain, that he never proceeded farther than his observations led him. Bennet is of the same opinion, for he says, " Though it is very
 " advisable to give milk, when the first stage of the
 " symptoms accompanying the phthifis already
 " appears to be approaching, nevertheless it is necessary
 " entirely to forbid it's use to the really
 " phthifical, and to substitute in it's stead whey,
 " mineral waters, and medical potions, varied according
 " to the circumstances*." And though the moderns in general have not paid due attention to the admonitions of these physicians, yet there are some among them, who agree, that milk proves useless in this disorder. For instance, Gilchrist says, " Whilst we willingly allow the use of milk
 " all the merit, to which it is justly entitled, we
 " cannot, through mere deference to custom and
 " authority, suppress one thing, to wit, that it fails
 " in almost every instance†." I can confirm the testimony of this author by my own observations, having very often seen milk given in this distemper; without ever observing any considerable benefit from it in a real pulmonary consumption.

In the last stage of the phthifis, the palliation of some severe symptoms requires a particular attention. The cough is to be moderated by

* L. l. cap. xxvii, p. 67 & 68.

† *On the Use of Sea-Voyages*, p. 123.

the exhibition of opium and dulcamara; the diarrhoea by absorbents, astringents, and opiates; the colliquative sweats, by the elixir vitrioli, lime water, a decoction of the bark, and a cold infusion of the flowers of sage; by exhibiting these remedies occasionally, the urgent symptoms are to be alleviated, and the patient's life is made as comfortable, as in such a situation can possibly be expected.

As to the use of issues, setons, and blisters in this distemper, Fothergill is of opinion, that they are useful, when the phthisis is produced either by the *metastasis* of some morbid matter, the repulsion of any cutaneous distemper, the consolidation of any inveterate ulcers, or a scrofulous diathesis: but that, when the phthisis is produced by other causes, "to prescribe issues, or blisters, seems "to be inflicting a certain pain, or perhaps "a grievous inconveniency to obtain a very uncertain advantage*." And in reality I have seen several cases in which issues were tried with no happy event. A great quantity of purulent matter was indeed discharged by them; but the patients became greatly emaciated, and weakened by it, and death quickly succeeded. From which cases it may at least be inferred, that such remedies are to be cautiously employed in a pulmonary consumption, not occasioned by the above causes; especially in a more advanced stage of the disorder. But with regard to blisters I cannot agree with this eminent physician, since these on many occasions may be usefully applied in phthisis not originating from the above causes, during the whole course of the disease.

* *Med. Obs. and Inquir.* vol. v, art. 33, p. 373 & 374.

Authors greatly dispute on the kind of air, that is most suitable in this disease; some recommend a pure air; others on the contrary a less pure one. The dispute, however, may be easily compromised, as there indubitably exist some cases, wherein an air more pure than usual is advantageous: and others are not wanting, where such an air would prove detrimental. For in all cases, in which an excess of the vital powers takes place, air containing but a small quantity of oxygen is salutary; and, on the other hand, where a torpor of the vital powers accompanies this distemper, the air is found to be more beneficial, according to the degree of it's purity. From this rule it may readily be perceived, in what cases sea-voyages towards Italy, Portugal, Spain, and the south of France are advantageous; and when, on the contrary, they do mischief, and the use of the carbonic acid gas may be substituted instead of them with benefit to the patient.

As to the balsams, by the internal use of which some physicians endeavour to consolidate the vessels of the lungs, I willingly agree with Stoll, that it is an erroneous practice, introduced to the destruction of many patients*; and indeed it will be evident to every one, from what I have proved above, that they who make use of these hot and stimulating medicines to cure the ulceration of the lungs, may be compared with those, who would extinguish a flame by the effusion of oil. But if there be still practitioners, who think the use of such remedies proper in this distemper, I refer them to the ingenious dissertation written by the renowned physician

* *Rat. Med.* pt. 3, p. 12.

Fothergill on the injury of the balsams, and the evils which generally accompany their internal use*: and I have not the least doubt, but that every one of them will in future desist from giving such medicines internally. I have seen the balsams tried, indeed, in some cases, but the effects were so unfavourable, that they were soon laid aside.

This disease, so dangerous even when alone, is still frequently complicated with other disorders. It is indeed true, that, *ceteris paribus*, those, who labour under phthisis, are less inclined to the reigning epidemic, than persons in sound health; yet there exist instances of the phthisical being also affected by it. Stoll mentions, that a painter, who had laboured under the phthisis for three years, came to him greatly emaciated in the year 1779, during a very inflammatory epidemic. He was bled a few times in a small quantity, and died unexpectedly at the end of six weeks. The body being opened, both lobes of the lungs were found heavy and greatly inflamed; the right lobe also exhibited here and there small abscesses, the source of the purulent matter during life†. From this case it appears, that an epidemic can be communicated to a phthisical patient, provided a proper affinity exist between the two disorders.

For brevity sake I shall not speak of the frequent complication of phthisis with tabes, and other diseases; though I cannot forbear mentioning, that

* L. l. t. iv, art. xxviii, p. 231 & seq.

† Stoll, l. l. pt. iv, p. 38. & 39.

consumptions of different parts sometimes not only exist in the same body, but also, that phthisis of one part not unfrequently gives rise to that of another. Thus it happens sometimes in the phthisis uterina, that the lungs become inflamed by sympathy, and a real pulmonary consumption takes place in consequence *. It is evident, that in such cases the disease is absolutely incurable; and that these two phthises must destroy life: the more, as this accident happens particularly to such women, as have either laboured under hæmoptysis in their youth, or whose lungs are naturally weak. I twice had an opportunity of observing the pulmonary consumption brought on by phthisis uterina; both happened in delicate females, after a laborious labour; both had been affected some years before with hæmoptysis; and in both the disorder terminated fatally.

I have treated more fully of the pulmonary consumption, than the compass of this treatise could well permit, on account of the great number of persons continually carried off by this disorder. It was also the more necessary to make an accurate inquiry into the nature of this complaint, and to endeavour to lay down general rules for it's cure, as almost every year different treatises on the pulmonary consumption are published, which, recommending quite opposite methods of treatment, cannot but prove injurious to persons who labour under this disorder. The manner of treatment I recommend is founded upon sound principles, and will I believe be farther confirmed by the observations of practitioners; at least

* S. Vogel, l. l. t. iv, kapitel xxiii, p. 324,

I have had some opportunities of seeing a radical cure effected, and more of considerable relief afforded by it. Moreover, as it is one of my principal designs, not simply to mention, in what manner the patients are carried off by any disease; but especially to explain, as far as possible, how the manner of killing is consistent with the nature of the disease; I was obliged to be more copious in regard to the treatment of phthisis, in order to show, that the difference of the symptoms observed in the different species during the course of phthisis, is no proof of the inconsistency of nature, as it were, in this disorder; as perhaps some might think, to whom all the forms of the distemper are not accurately known. Thus, on comparing together all that I have laid down on the different species of phthisis, it will be evident, that, though exhibiting various symptoms, they still agree in this, that the life of those, who expire by any species of phthisis, is always extinguished by slow degrees like the light of a lamp. The reason, why all phthisical patients are carried off in such a manner, seems to be two-fold: in the first place, some organ requisite to life is consumed by the ulcer, from the total consumption of which organ the life of the whole body must necessarily be destroyed: secondly, the solids grow daily more and more enfeebled by the morbid stimulus continually operating on the whole body, so that it's tone is at length wholly relaxed. That indeed death happens to the phthisical in such a way will be particularly evident, if we attend to the phenomena, which, in general, are observed towards the end of the disease, in those, who labour under any species of pulmonary consumption. For at this

this period the thrush breaks out in the mouth, palate, and 'throat, exciting pain and heat in swallowing; the voice becomes hoarse, and sometimes fails; a fetid smell arises not only from the breath, but also from the whole surface; pimples sometimes deform the wrists; an œdema both of the feet and hands takes place; a diarrhœa ensues; the temples fall in; the eyes sink; the nostrils become pinched; the patient is scarcely any thing but skin, and bone; the hair falls off; the nails grow curved, and the ends of the fingers bulbous; a delirium not unfrequently occurs; the expectoration is suppressed; the cough is calmed, but respiration is very difficult and anxious; the pulse languishes, flutters, and fails: thus death slowly steals on, and, scarcely ever foreseen by the patient, closes the scene.

GENUS II.

Caries.

CARIES is an ulcerating process of the bones, attended with more or less loss of osseous substance, a discharge of a thin ichorous fetid matter, and a roughness of the affected part, which may be easily discovered by the introduction of a probe.

This disorder is generally confounded with the necrosis ossium; but though caries, when not speedily remedied, usually terminates in necrosis, yet these two disorders are as distinct as the ulce-

rating process, and the sphacelus of the soft parts: for caries may be cured without the least portion of bone coming away; necrosis, on the contrary, is only to be removed by the separation of the dead bone; in the caries, the affected bone either retains it's natural healthy appearance, or is of a pale white colour; whereas, in necrosis, the bone is of a yellow, brown, or even black hue. It is, however, to be confessed, that the limits between caries and necrosis are not always distinct; and the practitioner is often at a loss, whether the disease in question be caries or necrosis; the more, as on account of the blood-vessels in bones being far less numerous, in proportion, than in the softer parts of the body, the former almost invariably changes into the latter, when any considerable injury has been done to the bone; and there are no certain characters to distinguish between the termination of the caries, and the beginning of the necrosis. The reason why caries at length generally terminates in necrosis, seems to be the following. Inveterate ulcers of the soft parts, we know, are often not to be cured, but by destroying the old surface by means of the caustic, so as to make a new one; because, by the long continuance of the disorder, the surface of the ulcer is degenerated so much as to be incapable of producing healthy granulations. Now as this is not unfrequently the case in long continued ulcers of the soft parts, certainly it is easy to be understood, why inveterate ulcers of the bones, which even in their recent state heal with difficulty, are not in general to be cured but by the exfoliation of the degenerated portion of the affected bone: the destruction of the diseased part is usually requisite

to the cure of them both in their inveterate state; the only difference is, that in one case it is generally destroyed by art, and in the other by the *natura medicatrix*.

As the caries is an ulcer of the bones, it is evident, that all causes, which bring on an inflammation of the bones, may, under certain circumstances, occasion caries. Of course, wounds, violent contusions from a fall, or blows on the part, ulcers and inflammations of the periosteum, and the improper application of sharp acrid spirits and powders to the bones merely laid bare by an accident; a practice, of which the ancient surgeons were so fond; in a word, whatever affects either the periosteum or the bones may produce caries. Experience however proves, that the periosteum is very frequently destroyed, and that even sometimes a very considerable loss of substance of the bone does occur, without any carious affection ensuing; therefore for the production of caries there seems to be requisite, at least in most cases, either a disposition of the bones of the system in general, or of those of the affected part in particular, to contract the disorder, when any proper exciting cause takes place.

The prognosis of caries depends upon a variety of circumstances. The nature of it's cause, the situation of the diseased part, the texture of the affected bone, the extent of the ulcer, and the age and habit of the patient, are chiefly however to be taken into the account. Thus caries arising from an external cause is in general more easily cured,

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than that which originates from any constitutional complaint: the caries succeeding to a wound of the bone is usually much less troublesome, than that which follows after a contusion of it: when the disease takes place in any of the bones of the skull, ribs, or vertebræ, it is attended with more risk, than caries in any of the bones of the extremities, on account of the diseased parts being situated so near to organs necessary to life: caries attacking the middle of the bones, is more easily remedied, than when the disorder attacks their ends, in which case the neighbouring joints often become affected: the deeper the caries penetrates into the substance of the bone, the more danger there is of an unhappy termination of the case; the greater the extent of the ulcer, the more time is requisite for it's healing: in fine, the age and habit of the patient are circumstances, which considerably influence the cure; for old people, and persons of a bad constitution, usually sink under the disease.

With respect to the treatment of caries the practitioner should always accurately consider whether the disorder be a constitutional complaint, or a local disease of the bone, in consequence of an external injury. In the first case, the remedies, which remove the cause of the caries, will for the most part remove the disorder itself: but if the caries were brought on by an external cause; if it be of a scrofulous origin; or if the remedies suited to the removal of it's cause, supposing the caries to be a constitutional complaint, do not seem to have any effect on the diseased bone; *asafoetida*, given

from ℥ii to ℥ii a day, will be found very efficacious, both in caries and in necrosis ossium. Under it's use, the ulcer puts on a more healthy appearance, the discharge becomes mild and of a good consistence, it promotes considerably the exfoliation of the bone, and the ulcer heals. For the first account of the efficacy of the asafœtida in this disease we are indebted to Mr. Schmucker, surgeon-general of the army of the late king of Prussia, in whose work there are recorded several cases of caries, which proved obstinate to all other remedies, but were cured by the exhibition of the asafœtida*. On his authority, I gave this remedy to a girl of ten years of age, who laboured under a caries of the lower part of the femur, communicating with the knee-joint. The disorder had continued for two years when I saw her, and a variety, both of external and internal remedies, had been tried, but without success. She took the asafœtida to the quantity of a drachm a day for some weeks, with such effect, that several pieces of bone came away, the ulcer closed up, and the girl did perfectly well, though the motion of the knee-joint was in a great degree lost. Since this I have had several opportunities of giving the asafœtida in carious affections of the bones, and the event has been such, that I am very much inclined to believe, that the asafœtida is nearly as much a specific in the caries and necrosis, as the bark in the ague, and mercury in the lues venerea. Other remedies may occasionally be joined with the use of the asa-

* J. L. Schmucker *Heelkundige Mengelschriften*, ex. vers. expert. J, Daams, t. i, p. 151, & seq.

foetida ; for instance, in caries originating from the venereal disease, mercury should be given at the same time ; in scrofulous cases, or where the strength of the patient is very much reduced, the bark ought to be joined with it ; when the patient suffers a great deal of pain and restlessness, opiates are to be given in conjunction with the asafœtida ; and even though the symptoms of general irritation are not so violent, as to require the use of opium, yet it will be advisable, in all cases where the patients are either of a delicate constitution or of an irritable fibre, to combine opium with the asafœtida, in order to moderate it's stimulating effects on the general habit. But this remedy does not agree with full plethoric temperaments, on account of it's operating too powerfully, before the patients are prepared for it's use by venesection and the antiphlogistic plan.

As to external applications, a variety of these are proposed by writers on the subject. The ancients, as soon as any bone was laid bare, immediately had recourse to powders and tinctures of aloes, euphorbium, myrrh, and other stimulants. As it is evident, that the only effects, which applications of this kind are capable of producing, farther than that of correcting the smell, are to irritate and inflame the soft parts of the wound, without having the least influence on the diseased bone, this practice is at present pretty generally laid aside. Others recommend in the necrosis the application of the actual cautery. This remedy, however, cannot fail of having pernicious effects ; for, if the cautery be used in a sparing manner, the diseased part of the bone

bone will not be removed; and if, on the contrary, it be applied so as entirely to destroy the diseased parts of the bone, the sound parts underneath will become undoubtedly inflamed in consequence of the stimulus of the heat applied, and will frequently be rendered carious likewise; in fine, by using the cautery you do not at all quicken the exfoliation, for though the affected parts of the bone be quite burned dead, still the same time is requisite for the separation of the bone, as this cannot take place, before a vacuity is formed between the dead and living parts, by the absorbents taking up the intermediate osseous particles. The actual cautery, therefore, never does any good, and is very likely often to do a great deal of mischief. Others are very fond of making a number of small perforations all over the surface of the diseased bone; but the objections we have stated to the use of the cautery hold equally strong with respect to these; since if the instrument penetrate into the sound parts underneath, these must necessarily suffer materially; if it do not go so deep into the substance of the bone, as to touch the living parts, they certainly are of as little use, as scarifications would be in the gangrene of the soft parts. Professor Weidmann of Mentz found, upon a large scale, that those patients, in whom the business was left to nature, usually recovered more quickly than those, in whom the actual cautery or perforations had been employed: Indeed, instead of quickening the process of exfoliation, these means often retard the natural exertion of the system for the removal of the disease *. Some surgeons make use of a large pledget

* *De Necrosi Ossium.*

of mercurial ointment. As it is not probable, that the mercury should penetrate to the diseased parts, this remedy cannot be attended with any good effects; but even taking it's action for granted, it would still be a very questionable point, whether the advantage gained would be comparable to the injury done to the general habit by it's use. The only external application, from which I have seen any benefit, in carious ulcers, is lime water; and I believe, that the covering of the ulcer with lint dipped in it, and the applying of a roller in order to make a moderate equal pressure, in all cases answer the purpose better than any thing else.

A carious bone, at least if the ulcer occupy any considerable extent, should never be laid open before the diseased parts loosen at their edges, in which case they may be taken away with the forceps; for if an extensive bony surface be exposed to the air for any considerable length of time, the parts underneath not unfrequently become affected with caries likewise, and the loss of the limb is sometimes the consequence of such a practice.

If the caries prove incurable, and the diseased part be so situate as not to admit it's removal by amputation, the general habit becomes sooner or later affected by the diseased action of the affected part; the patient is extremely reduced in strength, in consequence of the continual irritation of the system by the carious ulcer; and a hectic fever comes on, under which he gradually sinks.

GENUS III.

Lues Venerea.

THE venereal poison, in the same way as most other contagions, first produces a local complaint, which, when not remedied by the destruction of the poison, is at last taken up by the lymphatics, and produces the general infection. Sometimes the symptoms of confirmed lues are observed indeed, without the patient's previously experiencing any local complaint; these cases, however, but rarely take place. The local disorders brought on by the venereal poison are gonorrhœa, chancre, and bubo.

Gonorrhœa is the form, under which the disorder most frequently appears, and is to be looked upon as an inflammation of the urethra, occasioned by the specific stimulus of the venereal virus. It is attended with a discharge of mucus from the orifice of the urethra; a pleasing titillation of the glans; tension and redness of the penis; pain and scalding in micturition, and frequently bloody urine; an involuntary and painful erection, with an incurvation of the penis. The complaint, when left to nature, would in general wear itself out; but as this is tedious and uncertain, it is therefore better to put a stop to the disorder by art, which usually may be done in a short time with safety to the patient.

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The cure consists in counteracting the venereal poison, and in keeping off the irritation of the system in general, and of the affected organ in particular. The venereal poison is best counteracted by injection of a dilute solution of the lapis causticus, a solution of the mercurius sublimatus corrosivus, or of the ærugo æris, or the aqua calcis. If, however, there be a great deal of pain and inflammation, such injections would be highly improper, and Goulard's water with the tincture of opium, or this tincture diluted with water, is to be used, in order to abate irritation; an opiate is to be given every night; the part is to be kept clean; the body is to be kept open by cooling and gentle laxatives; the scrotum is to be suspended; and leeches are to be applied to the part. Cold, and every thing capable of irritating the system, especially the affected part, are carefully to be guarded against. In cases where the fever and inflammation run very high, the penis is to be wrapped in fomentation of poppy heads; bleeding is to be prescribed, and the whole of the antiphlogistic regimen is to be adopted. By such treatment the gonorrhœa is in general easily and speedily remedied. If, however, the injections have not been sufficiently diluted, so as to give little or no pain; or if they were thrown up too far into the urethra; if the patient have imprudently exposed the affected organ to cold; if, from any neglect on the side of the patient, from improper treatment, or from any other cause, the inflammation of the urethra have been increased to a considerable degree; the consequence is, that the gonorrhœa suddenly stops, and some other organ becomes

becomes affected by sympathy. Hence the hernia humoralis, ischuria, and the acute ophthalmia, which are the chief complaints arising in consequence of the gonorrhœa being stopped, ought to be explained.

The hernia humoralis, or the swelling of the testicle is the most frequent symptom that follows the suppression of the gonorrhœa. It is at present generally allowed, that the swelling of the testicles is owing to their sympathy with the urethra, and by no means to the venereal poison's being conveyed to them; as dissection teaches us, that lymphatics going from the urethra to these organs do not exist. The complaint may be foreseen by a violent rending pain in the lower part of the belly, gripings of the bowels, and retching. Soon after the patient feels severe pain along the whole course of the urethra, which is extended to the vas deferens, the epididymis, and the body of the testicle itself; and there arises a swelling of these parts, which often acquire an enormous bulk. As this complaint is nothing but a sympathetic inflammation of these parts, the best treatment consists in abating the inflammation, which is most effectually done by keeping the scrotum suspended, and the body open by gentle laxatives; by applying leeches, and cold fomentations of Goulard's water, to the part; by the use of opiate clysters; and by giving opium by the mouth. The diet of the patients ought to be antiphlogistic, and sometimes the drawing of a certain quantity of blood is necessary. By these means the complaint is very often effectually remedied. Frequently, however, the inflammation
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of the testicle terminates in an induration and enlargement of that organ, which proves difficult and often impossible to be removed. The most powerful means of reducing the testicle to it's natural size and softness are a poppy fomentation, an oatmeal poultice, the cicuta and gum ammoniac, camphor and volatile liniment, and more particularly the introduction of a bougie into the urethra. If upon trial all these remedies should unhappily be found incapable of accomplishing the resolution of the indurated testicle; the patient may console himself with the reflection, that this induration of the testicle never degenerates into the sarcocele, is unattended with any danger, and does not in the least interfere with the functions of the organ.

Another accident, that is now and then met with, is, that the swelled testicle feels softer to the touch than natural, becomes gradually less and less, and is in time wholly absorbed, so that nothing is left but a membranous bag. This is a very unpleasant circumstance, both for the patient and the practitioner, as the disorder is beyond the power of physic. Fortunately this case seldom occurs.

Both the ischuria, and the acute venereal ophthalmia, are likewise to be considered as sympathetic complaints. The first is to be remedied by the application of leeches to the inside of the thigh; by rubbing the volatile liniment with camphor into the region of the pubis and the perinæum; by blisters; by applying a poppy fomentation to these parts; by clysters, the warm bath, gentle laxatives, bleeding, and opium; by the introduction
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of a catheter; and lastly by puncturing the bladder above the ossa pubis. The other by the application of leeches, the tincture of opium, the scarification of the membrana conjunctiva, opiate clysters, and the antiphlogistic regimen.

In treating of the cure of the gonorrhœa, and the complaints it often occasions, I have not mentioned either the giving of mercury, or any other remedy used in the cure of the lues venerea: for, as the gonorrhœa is nothing but a local inflammation of the urethra, occasioned by the specific stimulus of the venereal poison, and as a specific affinity between the venereal poison and the absorbents is requisite before it can be taken up into the system; as, in fine, experience teaches us, that this affinity is very seldom produced without an ulcerated surface being previously induced by the poison; because the original orifices of the lymphatics, on account of their inherent elective power, are much less liable to absorb stimulating substances than their trunks; the natural inference must be, that the cure of a clap is to be performed by topical remedies, and the antiphlogistic regimen; and that the administration both of the preparations of mercury and of nitrous acid, in a word of all medicines for the purpose of destroying the venereal poison, is useless; as it is sufficiently evident, that all medicines whatever must lose their powers, before they can possibly reach the seat of the complaint. It has been a matter of dispute, whether the virus of the gonorrhœa were really the same with that of the confirmed lues; but since, when the urethra is injured in gonorrhœa, either by an im-
prudent

prudent introduction of the catheter, or by any other cause, the lues is not an unfrequent consequence; since besides, it is well known, that sound women, by having sexual intercourse with patients labouring under the gonorrhœa, often get chancres, and *vice versa*; it is manifest, that the virulent gonorrhœa and the lues venerea are both effects of the same poison, and by no means of two different morbid matters.

When, after the cure of the gonorrhœa, a discharge from the urethra, called a gleet, remains, this, if it depend on a slight inflammation of the urethra kept up by the weakness of the organ, is to be cured by injections of a solution of alum, of the cuprum ammoniacale, of the vitriolum album, of the vitriolum cœruleum, or of the hydrargyrus muriatus. Sometimes, when all these remedies have been tried in vain, the complaint has been found to originate from a stricture in the urethra, and has been removed by using bougies. Now and then, however, the gleet does not yield to any remedy, and after every thing has been given without success, it at last wears itself out in time.

The venereal poison, especially when applied to parts covered but with a thin cuticle, operates with such violence, as to produce ulceration. The venereal ulcers, or chancres, first appear in the form of a somewhat purplish red spot. This changes into several small pustules, which, running together, form a deep, large ulcer, narrow and contracted at the bottom, with white, ragged, and somewhat callous edges; and the circumference looks red and inflamed, to a considerable distance beyond the fore.

fore. As in these cases, on account of the ulcerated surface, the danger that the system will become infected by the poison is always very great, the most effectual method of treating the chancres is to touch it with some strong caustic; for by this all the venereal matter being destroyed at once, the ulcer is reduced to the state of a simple purulent sore. It is true, indeed, that practitioners are frequently not called in till after some time, and till the different ulcerations are considerably enlarged: but, as the absorption of the poison often does not happen till some days have elapsed, even from an ulcerated surface; as experience has taught me, that patients labouring under chancres may in general be cured by topical applications, without their afterwards experiencing the least symptom of the disorder; and as this fact is likewise confirmed by the practice of other physicians*; as long as the symptoms of the confirmed lues do not make their appearance, we ought to treat the chancre as a local complaint; and in cases, in which, on account of the extent of the ulceration and the tender structure of the parts, it might sometimes be dangerous to apply the more active caustics, the washing of the part with lime-water, and the dressing of the sore either with the *mercurius præcipitatus ruber*, or with lint dipped in a strong solution of the *argentum nitratum*, several times a day, are to be adopted; by means of which the chancre will soon be reduced to the state of a simple ulcer, and the progress of the infection will frequently be prevented.

* *Astruc, de Morbis venereis*, t. i, p. 536: and *Girtanner*, l. 1. zweites buch, 1 theil, seite 212.

Phymosis, paraphymosis, and warts, often attend chancres. In the phymosis the constricted prepuce is to be relaxed by the use of warm milk, emollient poultices, or Goulard's water combined with laudanum; the aqua calcis is to be injected several times a day between the prepuce and the glans, in order to prevent cohesion; and topical and general bleeding are occasionally to be used. When these means have been tried in vain, and chancres are confined under the prepuce, it becomes necessary to remove the stricture, by an incision carried along the whole extent of the preputium. In the paraphymosis, if the prepuce cannot be brought forwards over the glans by a gentle attempt of the surgeon, cold saturnine applications, bleeding, and a low diet, are to be tried. But if these remedies be found ineffectual to abate the swelling of the glans, and to remove the stricture of the prepuce; in order to prevent a mortification of the glans from coming on, a complete removal of the stricture is to be accomplished by the operation, which is performed by making a deep scarification of about half an inch in length on each side of the penis, directly behind the glans. As to the warts, if they be of any size, the taking them away with a pair of scissars best answers the purpose. When they are but small, touching them with caustic, or the application of the pulvis sabinæ, proves the best mean of removing them.

The third main primary symptom of the lues venerea is a swelling in the groin, or a bubo. The bubo is for the most part a sympathetic affection, arising from gonorrhœa or chancre. Sometimes,
however,

however, it is the consequence of the venereal matter being conveyed to the gland by the lymphatics. In the commencement of the complaint, it is often impossible to distinguish the idiopathic bubo from the sympathetic; but, indeed, it seems to be a matter of little importance to know whether it be idiopathic or sympathetic; for in all cases, as long as the patient shows no symptoms of the confirmed lues, the bubo is to be considered as a local inflammation of a lymphatic gland, the resolution of which is to be accomplished by emetics; the application of leeches, in cases where there is much inflammation; the cold solution of Schmucker, consisting of sal ammoniac, nitre, vinegar, and water; and the rubbing of the inside of the thigh frequently with the volatile liniment and camphor; by which means, when employed in an early stage of the disorder, the bubo may almost always be resolved. If, however, after three days, the bubo, instead of going back, be found still to increase in bulk, all attempts to effect a resolution ought to be laid aside, and suppuration is to be promoted by the application of warm poultices to the part: which sometimes ought even to be of a stimulant nature in weak persons, to whom, both to promote the suppuration, and during the course of it, the bark and wine are to be given. As to the opening of the abscess, this is best left to nature, by which all the inconveniences that often attend an artificial opening are prevented.

It will doubtless be deemed reprehensible by some practitioners, that, contrary to the general custom, I do not advise the exhibition of mercury, either in the chancre or the bubo, till the symptoms

of the confirmed lues are coming on; but, as experience proves, that chancres, for the most part, may be cured by topical means alone, without the least symptoms of the lues afterwards appearing; and that the idiopathic and sympathetic buboes are not always to be distinguished at the commencement; it seems to be highly improper to weaken the system by the exhibition of mercury, previous to the symptoms of the confirmed lues making their appearance. More especially as this preservative cure, as it is called, is of no use at all in preventing the secondary symptoms; for, as the late John Hunter justly observes, mercury does not destroy the disposition of the body to contract the lues. Indeed if this were the case, to prevent the lues the taking of mercury would be sufficient. Experience, however, shows the contrary; for it sometimes happens, that when patients have been even salivated for the cure of chancre and bubo, still after some time they find the symptoms of the confirmed lues coming upon them. It is said, that in these cases the venereal poison has infected the constitution so much, that one mercurial course was not capable of performing a radical cure: but the fact is, that mercury does not destroy the susceptibility of the system for the poison, any more than any other specific; it only takes away the noxious effects upon the system by putting a stop to it's action. It follows, therefore, that mercury, given before the symptoms of the lues appear, can have no other effect than that of hurting the constitution. As, however, the prejudices of people are very great, it will be most prudent, along with the external remedies, to exhibit small doses of mercury, so as to operate as an alterative,

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in order to satisfy the mind of the patient ; which exhibition of mercury, though probably it is of no use at all, cannot materially injure the constitution.

If the venereal virus be not destroyed at the spot, at length the requisite affinity being produced between the poison and the inflamed absorbent vessels, it is taken up by the lymphatics, and conveyed to the blood, so that the whole constitution becomes infected. The poison, however, more especially affects the absorbent system and the secreting vessels. The morbid matter is deposited by metastasis on different parts of the body. It attacks the palate, the throat, and the nose, with an inflammation, terminating in an ulcerating process. The ulcers, which secrete a fetid matter, are deeply seated, spread, and waste the neighbouring parts. Various bones, especially the more tender ones, such as those of the palate, the ears, and the nose, become carious, and drop out; hence deglutition, smelling, hearing, and speaking, become difficult. The patient complains of head-ache, and of universal pains in the bones, especially about the middle of the tibia; which pains are exasperated at night. Different extuberances of the bone take place. The bones become fragile, and sometimes soft and flexible. The skin is often covered with broad spots of a brown or copper-colour, afterwards turning red, and at length crustaceous, attended with itching, and ulcers breaking out in several places. All these symptoms daily increase, and a hectic fever soon comes on; produced not by the absorption of the venereal matter, for this poison has been taken up a long time before, but by the continually

tinually irritating noxious stimulus, by which the solids grow every day more and more weakened and degenerated, till at last their tone being totally destroyed, death ensues, so that life is extinguished by slow degrees, somewhat in the same manner as in the phthisis. Nay, sometimes those who are destroyed by the lues die of a real pulmonary consumption; when either the preparations of mercury, particularly the hydrargyrus muriatus, are imprudently used, or the lungs of the patient are naturally weak. These cases nevertheless but rarely occur. Bennet, that accurate observer of consumptions, had in his practice seen only two instances, and I have myself observed the venereal phthisis only once: so that this poison does not seem to affect the lungs except by accident.

The prognosis of the confirmed lues is to be taken from the degree of the disorder, and the constitution of the patient; for though in sound bodies, in the commencement of the disease, when properly treated, it is not dangerous, yet when the malady is very far advanced, when it attacks weak persons, or the constitution of the patient is hurt by salivation, it often carries off those who labour under it. These circumstances, therefore, ought carefully to be attended to in the prognosis.

With respect to the cure, mercury is the chief antidote we possess. This is to be introduced into the system either by friction, or by giving it internally. The internal exhibition of mercury I prefer to the rubbing it in, for the following reasons.

1. In the latter method it is impossible to know
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the quantity of mercury absorbed, and it is thus always to be feared, that we may administer either too little or too much. 2. Such treatment cannot be pursued in irritable persons of a delicate frame, or labouring under any complaint of the lungs: for as thus a large portion of mercury is at once conveyed into the system, the constitution is very much hurt by the unusual stimulus; convulsive symptoms, and even epilepsy are not unfrequently produced by it; the nervous system is always greatly injured, and, if the patient be weak, mortification of the part affected, and death itself are often the consequences. Beside this quick introduction of a large dose of mercury into the system by friction, in order to promote salivation, not only does not promote the cure of the disease, but often proves worse than the complaint itself, by the sudden shock it communicates to the constitution. Indeed I have frequently seen patients destroyed by the weakening of the system, and convulsive fits brought on by their going through what is commonly called a mercurial course, whose lives in all probability might have been saved, if the mercury had been administered in a more slow and gradual manner. Salivation does not in the least contribute to the cure of the complaint, and always extremely weakens the constitution. I have seen patients who had undergone salivation three times, and who had been continually spitting during six months, yet, notwithstanding, the action of the venereal poison on the body was still going on. It is indeed an erroneous practice to judge of the effect of mercury against the venereal poison by the degree of salivation which it produces: for

while in some persons all the complaints will disappear without scarcely any spitting at all, in others the salivation will come on in a few days from the exhibition of mercury, and continue during several days without the disorder's being diminished. Some persons do not seem to be affected by the rubbing in, till, after some days, a sudden prostration of strength comes on, attended with febrile commotions and night-sweats; and the physician cannot but with difficulty, by the exhibition of bark and opium, prevent the disorder from proving fatal. Salivation is also a very uncertain method of curing the lues: for, to cure the venereal complaint, the introduction of a sufficient quantity of mercury is not enough; it is likewise requisite, that this remedy should remain in the system during a certain period, in order to destroy the action of the poison. Now when the mercury is introduced into the system in a large quantity at one time, it is quickly expelled the body by the different excretory organs, on account of the violent stimulus; whereas, administered in a slow and gradual manner, the mercury is retained much longer in the constitution. This seems to explain what I have several times seen, that persons, who had gone through two or three mercurial courses in vain, have been cured by the treatment I am now about to recommend; which is the making use of the *mercurius dulcis*, the *mercurius precipitatus cinereus*, and the *hydrargyrus muriatus*. But I would seldom recommend the administering of the mercury alone; as in general it is best to give a decoction of the bark, and opium, along with it; and by taking this precaution, even the *hydrargyrus muriatus* becomes a safe remedy, except in persons of a delicate constitution, and weak

weak lungs. In cases, where the patient wishes to conceal the complaint he labours under, the exhibition of mercury, opium, and the extract of the bark, in the form of pills, is the most convenient. By giving the bark and opium along with the mercury, the dreadful effects, which this remedy often produces upon the constitution, are effectually prevented, and the gripings, diarrhœa, and other disorders of the *primæ viæ*, of which the internal exhibition of mercury in irritable persons is frequently productive, are likewise obviated. The bark and opium seem to give to the mercury an additional efficacy against the venereal poison; at least I have found these remedies effectual in cases, in which the patients had gone through mercurial courses, and had used the nitrous acid, and the whole class of the oxygenates in vain. Though it is not to be denied, but that the radical cure of such patients even by the means here spoken of, is often difficult, on account of the long continuance of the disorder, and the reduced strength of the patient. It ought likewise to be observed, that, in order to accomplish a radical cure, these remedies are not to be desisted from immediately after the disappearance of the symptoms; but ought to be persevered in at least a fortnight or three weeks longer.

With respect to the quantity of mercury requisite for the cure of the disease, this admits of a considerable difference, according to the various constitutions of the patients. However, as we are not capable of determining beforehand the susceptibility of the system for the action of the mercury, it may be laid down as a general rule, to begin with

small doses, and afterwards, when it is found, that the disease does not yield to their use, to increase the dose by degrees. During the use of mercury, a moderate quantity of wine may be allowed, and the use of animal food, which, far from doing mischief, is advantageous in supporting the constitution.

Several other remedies beside mercury have been recommended for the cure of the venereal disease. Of these the astragalus exscapus, and the nitrous acid, deserve to be noticed. From the decoction of the former I have observed much benefit, for the removing of exostosis, and different affections of the skin, obstinate even to mercury. The nitrous acid I have seen given with success in several instances of the venereal fore-throat, exostosis, and different cutaneous affections, and often bring a speedy relief of the complaint. In other cases however I have seen it tried without the least benefit, and sometimes with mischievous effects. I never saw a radical cure of the confirmed lues produced by it, where it was certain, that the patient had used no mercury before. Some, after having been apparently cured, returned at the expiration of some weeks with the complaint upon them. I am therefore perfectly satisfied, that it is a powerful auxiliary, but by no means to be depended upon alone for curing the confirmed lues. The meze-reon, guaiacum, nux juglans, sarsaparilla, and the warm bath, have likewise been found occasionally to assist mercury in removing the disease.

As to the *modus operandi* of mercury in the venereal disease, the pneumatic physicians are of opinion,

nion, that the effects of the venereal poison consists in the diminution of irritability, or in the want of oxygen; and that the disease is cured by the decomposition of the mercurial calx in the human body, so that, the quicksilver being expelled the body by the different emunctories, the disengaged oxygen restores the requisite tone to the system by it's stimulating power. For, say they, the preparations of mercury must operate in the lues by the resolution of it's principles, because this disease is likewise cured by the administration of the nitrous acid, the oxygenated muriatic acid, the citric acid, and the oxygenated muriate of potash: consequently the effects produced in common by these remedies must be owing to the disengagement of oxygen, their radicals being all possessed of different powers. But this argument will be found totally groundless, if we observe, that, except the nitrous acid, none of them have ever been given except in chancre and bubo alone, which, as we have already shown, being local complaints, are not to be cured by the exhibition of internal medicines, but by the application of topical remedies: and that even the nitrous acid, though enjoying a much greater quantity of oxygen, yet is found much inferiour to mercury in the cure of the confirmed lues. Besides, taking it for granted, that the above medicines all enjoy an antivenereal power, still, if we consider the different doses, in which they are used, and the different effects produced by them upon the constitution, it will appear, that they by no means operate by the disengagement of their oxygen. For the nitrous acid is given from one to five drachms in the space of twenty-four hours; the oxygenated muriatic acid, from a scruple

scruple to four drachms; the citric acid, from three ounces to eight; and the oxygenated muriate of potash, from twelve grains to about a drachm. Now if these medicines operate only by the disengagement of their oxygen, how is it to be accounted for, that the quantity of the oxygenated muriatic acid requisite to the cure surpasses four times the dose of the oxygenated muriate of potash, as it is a fact, that the latter by no means possesses a larger quantity of oxygen than the former? How can a drachm of oxygenated muriate of potash possibly afford to the system the same quantity of oxygen as eight ounces of the citric acid? We find no less difference with regard to their effects upon the constitution. The quantity of mercury requisite to cure the venereal disease, when administered in the usual way, weakens the body, especially the nervous system, affects the teeth, gums, and mouth, and often produces salivation. The nitrous acid occasions costiveness, and gripings of the bowels, strengthens the *primæ viæ*, proves a powerful tonic for the whole system, and by it's stimulating quality it now and then even induces an inflammation. The oxygenated muriatic acid causes great thirst, a white tongue, a quick pulse, and an inflammatory state of the blood. The citric acid improves the appetite, and promotes the secretion of urine. The oxygenated muriate of potash produces a white tongue, and a greater inclination than usual to drink; but the pulse is natural, and there is no sensible increase of heat on the skin*. As there-

* See Dr. Rollo's *Account of two Cases of the Diabetes mellitus*, vol. ii, p. 163, 168, 174, 189, & 194.

fore these medicines produce quite different effects upon the constitution, supposing that they all really enjoy the faculty of counteracting the venereal poison, the natural inference must be, that their *modus operandi* does not depend upon their common principle, or upon the disengagement of oxygen.

Farther, if we inquire a little more accurately both into the symptoms of the lues venerea, and the *modus operandi* of mercury on the human body, no doubt will remain, but this opinion is quite contrary to the observations of nature. Indeed are a gonorrhœa, bubo, hernia humoralis, and the venereal inflammation of the eyes, signs of a diminished irritability? How can the pain and exostosis of the bones possibly be explained from the want of oxygen? If the preparations of mercury excite the vital powers by supplying oxygen, why do they prove hurtful in putrid diseases? Does the mercury operate in the inflammations of the liver by imparting fresh oxygen to the system? Are the vital principle and the tone of the body increased in those, who have made use of mercury during a long time? Can the hæmoptysis, which not unfrequently follows the abuse of mercury, be accounted for from excess of the vital powers? I need not to mention the improbability, that any remedy should operate by a mere chemical resolution of it's component parts in a living body, in which, as I have above shown, strictly speaking, no chemical action can take place. These instances are wholly sufficient to prove, under how many difficulties this theory labours. It seems to me probable, that, as the bark does not prevent the approaching ague,

but

but removes the febrile character when the disease is produced, so likewise mercury does not prevent the lues venerea, but the venereal disease being communicated to the system, it destroys the disposition impressed by the poison on the lymphatics continually to convert the fluid they contain into a matter of a peculiar kind partaking of the venereal character and expels the poison from the body by means of the vital principle.

GENUS IV.

The Leprosy.

PERHAPS I rank this disease improperly: however, as ulcers always precede the hectic fever accompanying it, I think it agrees best with this order.

The nature of the leprosy is involved in great obscurity. It is almost a stranger now in the temperate regions of the globe: yet, though it seldom occurs, as it in general proves fatal when it takes place, and as it is frequent in the european colonies, I shall give a brief description of this horrible malady, as I find it in it's best commentators; and I shall explain, as far as I can, it's mode of operating.

The first symptom of the leprosy is a change in the colour of the skin, in the part of the body in which the complaint breaks out, accompanied with insensibility in the affected part. It appears indifferently in all parts of the body, but never manifests itself in any part without at the same time affecting one of the three following; the parts covered with hair in the axilla, the region of the pubes, and the buttocks where the muscles are covered with a great quantity of fat *. On the last of these it is most common. The spot is first of a pale or white colour, growing afterwards yellow, livid, or red. This spot slowly increases, and the malady then shows itself on other parts. A horrible deformity of the face is produced; the cheeks grow red, and, by degrees, blue and livid; the wrinkles of the forehead become leonine; the sight fixed; the eyes round; the nostrils fetid, thick, and inwardly obstructed; the lobes of the ears thicken; and the skin puts on the appearance of that of an elephant, unctious, rough, squamous, wrinkled, rimose, and destitute of hair. The leprous spots break out all over the body, from the face to the soles of the feet, and, changing into tubercles, occasion surprising deformity. The whole of the integuments of the body tumefy and indurate, and the perspiration is almost entirely suppressed. The patient becomes melancholy, tired of life, and very salacious. The tubercles change into deep, putrid, and phagedenic ulcers. The bones, especially of the nose and fingers, grow carious, and drop off. Glandulous tumours some-

* G. G. Schilling, *de Lepra Commentationes.*

times arise. The blood drawn from a vein appears dissolved; the voice becomes hoarse and nasal; the breathing difficult and fetid; and the hair falls off. A hectic fever comes on; and at length wished-for death puts an end to the tragedy*.

This disorder is contagious, and descends from parents to children. Nay it is commonly believed, that it can be propagated to the fourth generation†. In those who are predisposed to this malady, it is either excited, or, when already existing, augmented, by a bad irregular diet, especially by living upon half rotten flesh or fish, and by the use of impure water.

The prognosis of the leprosy is very ominous; Callisen and Joannis pronounce the malady incurable; Schilling, however, who had frequent opportunities of seeing this disease in all it's forms, observes, that it can be cured in it's commencement, but that no remedy is capable of vanquishing it, when inveterate‡. He accomplished the cure chiefly by means of aperients, purgatives, tepid baths, diaphoretics, and bitters; and he observed, that all the preparations of mercury were extremely hurtful. As to the proximate cause of this disease, Schilling is of opinion, that it is the too great visciduity of the lymph, arising from a thick blood,

* Schilling, l. l.: Callisen, l. l. t. i, p. 368: and *Med. Obs. and Inq.* vol. i, art. xviii, p. 201.

† Schilling, l. l. § xxx, et seq.: et *Med. Obs. and Inq.* l. l. p. 204.

‡ L. l. p. 36 et seq

and the consequent want of perspiration*: but this opinion is quite contradictory both to the symptoms of the disorder, and to the doctor's own observations. It is by no means easy, however, in so obscure a subject, to substitute in the place of this theory one more consistent with the phenomena observed: yet, as far as can be concluded from the symptoms of the distemper, it seems to me to be highly probable, that the leprous character is impressed on the children from the parents; that is, that such a disposition of the solids is communicated to their very tender bodies, as renders them liable to be infected with the leprosy at the approach of a proper exciting cause. This opinion is confirmed by this; that, according to the testimony of Dr. Schilling, "children born of
 " leprous parents often incur no disorder, but grow
 " up healthy and vigorous till the age of puberty,
 " when the leprosy suddenly manifests itself†;" an evident token, that the disorder itself is by no means communicated, but the predisposition to it alone. Moreover, Dr. Schilling himself in another place seems to be of my opinion; for he says, "if
 " children, whose parents labour under this distemper, be committed to the care of healthy
 " nurses, and sent to a salubrious and colder
 " air, they often remain free from this disease,
 " though they have it's predisposition in them,
 " which sometimes breaks out after many years,
 " when they return into their native hot country‡."

* L. l. p. 29.

† Ibid.

‡ L. l. p. 38.

In the same way this disorder is communicated to a sound person by infection; for then also the leprosy itself seems not to be brought on, but only the predisposition to it impressed on the patient. And this seems to explain, why, notwithstanding this disorder is infectious, women, when healthy, and regular in their diet and manner of life, may not only often live with their leprous husbands for a long time without any apparent marks of their being infected*; but several even remain entirely free from the leprosy†; for, though the leprous character is communicated to the wife by the husband, nevertheless the predisposed solids are prevented from producing the leprosy by a proper regimen and way of life. If however any exciting cause supervene, the predisposed solids are induced to take on certain actions, the consequence of which is the secretion of poisonous matter of a peculiar kind, partaking of the leprous character. In this case when the patient is strong and vigorous, nature alone sometimes vanquishes the distemper, and then this secreted matter, is separated from the mass of fluids, and carried to the surface of the body, where, being changed into crusts, it falls off in scales. That this happy event is sometimes observed in the leprosy, was well known even to the famous legislator of the jews, Moses, who, having forbidden to the israelites the use of such meats as in a hot climate may produce this disorder in the predisposed, afterwards giving laws on the leprosy itself, says, “ And if a leprosy

* Schilling, l. l. p. 34.

† *Medic. Obs. and Inq.* l. l. p. 204.

“ break out abroad in the skin, and the leprosy
 “ cover all the skin of *him that hath* the plague
 “ from his head even to his foot, wheresoever the
 “ priest looketh.

“ Then the priest shall consider: and behold,
 “ if the leprosy have covered all his flesh, he shall
 “ pronounce *him* clean *that hath* the plague: it is
 “ all turned white: he is clean*.

Thus this *divine* man had perceived, that, in such cases, the leprous matter being deposited by a happy crisis at the surface, and there formed into crusts by the discerning vessels, the disorder is removed.

The vital powers however are, for the most part, unable to vanquish this distemper; yet they continually resist it, and by their reaction the morbid matter is, in great part, carried by *metastasis* to some part of the body, which, being soon totally altered by the leprous stimulus, exhibits the common symptoms of this disease, the rest of the body still remaining in a tolerably healthy state. As a proof of this, all the secretions are almost naturally performed in the beginning of the disorder, except that of urine alone, which in the commencement of the leprosy is pale, and resembles in smell the pickle, in which herrings are preserved†. And in farther confirmation of it, if the afflicted part be extirpated at some distance, the other parts appear in a natural state: which is no way surprising,

* *Lev.* chap. xiii, ver. 12 and 13.

† Schilling l. l. p. 16 & 19.

since the remaining portion of contagious matter is then too small for it's effects to appear in the rest of the body; so that by a proper diet, and manner of life, such patients may often live in a pretty healthy condition even for twenty years. But if, indulging their inclinations, they neglect the dietetic rules, this remaining matter, reanimated, as it were, by the access of a noxious stimulus, operates much more violently on the solids; which, already weakened by the former struggle, are unable to resist this renewed attack; and, being continually stimulated by the poisonous stimulus, entirely degenerate; the secreted humours become vitiated, and intolerably offensive; and a hectic fever arises, soon ending in death*.

I do not venture to assert, however, that the manner of dying of leprous patients perfectly agrees with that of the tabid, and the phthisical; for Dr. Joannis says, that a woman, whose husband had died of the leprosy, informed him, that her husband was more disposed to venery after having contracted this complaint than in the vigour of his health; and even that he had had sexual intercourse with her more than once with the utmost ardour within twenty-four hours of his death†; but I greatly doubt, whether this would have been the case with any labouring under either tabes or phthisis.

* Schilling l. l. p. 16.

† *Med. Obs. and Inq.* l. l. p. 208.

O R D E R II.

Atrophies.

G E N U S I.

Tabes.

THE tabes is a general wasting of the whole body, but usually without any cough or expectoration.

As this distemper is produced as often, as the body, not being properly nourished, or being violently stimulated, becomes weakened and emaciated; it appears, that it may be engendered by a great variety of causes. Whatever impedes the act of swallowing, prevents the descent of the food swallowed to the stomach, impairs the action of the stomach and intestines on the food taken, injures the absorbent, sanguiferous, or secerning system, produces an alteration of the structure of the bowels, or preternaturally stimulates the body, may, under certain circumstances, occasion tabes; though, in my humble opinion, all the causes of this disorder, with respect to their manner of operating, may be reduced to the four following species:

I, Those, which bring on tabes by the depraved manner of acting of the lymphatic or sanguiferous system. This is the case in all those commonly called secondary phthisical consumptions, such as the scrofulous, the rickety, the scorbutic, the venereal, &c. This tabes, being always a symptom

of another disease, may be justly called symptomatic.

2, Those, which occasion this distemper by the vitiated action of some organ; to which species all the various affections of the viscera (obstructions), depraved secretions, destroyed tone of the alimentary canal, &c., belong.

3, The degeneracy of the organical composition of some organ, the function of which is requisite to life. These cases are not unfrequent, as may be inferred from the following instances. Tulpus has observed a hard tumour between the œsophagus, and the windpipe, first straitening, and afterwards totally closing the upper part of the œsophagus, so that, the passage of the food being impeded, the person died of hunger*. Van Geuns and Nahuys, relate many such cases†. Francis Pringle mentions a case of a man killed by tabes, in whose body a hard glandulous tumour was found, which exactly filled up the whole cavity from the middle of the œsophagus to the mouth of the stomach, so that a probe could scarcely be introduced into the stomach‡. Dr. Taylor has observed a scirrhus tumour occupying the superiour part of the stomach§. Dr. Simpson has found, in a woman who died in consequence of the passage of food to the stomach being impeded, the œsophagus cartilagin-

* L. I. lib. i, cap. xlv, p. 28.

† *Hollandfche Maatschappy*, etc., ii deel.

‡ *Med. Essays and Obs.* Vol. ii, Art. xxiv, p. 277.

§ *Med. Essays and Obs.* l. l. p. 278.

ous almost through it's whole length from the clavicles to the stomach, and so narrow, that it scarcely transmitted a bristle *. Triller saw a fatal hunger occasioned by a callous narrowness of the mouth of the stomach †. Haller and Ruysch have seen the stomach afflicted with a scirrhus ‡. Stoll has found the pylorus narrow, harder than usual, and scarcely admitting a quill §. Tissot has seen the liver totally scirrhus §. Haller mentions a scirrhus of the cawl ¶. Morgagni and Walter have found the glands of the mesentery enlarged, indurated, almost changed into a stony substance, and filled up with a kind of cretaceous matter **, which, upon examination, was found to be phosphate of lime.

4, Morbid stimuli, which, by continually irritating the system, produce a hectic fever and consumption in an otherwise sound body.

The prognosis of the tabes is, in general, ominous. In the first species, or in the sympto-

* *Mémoires de l'Académie Royale de Chirurgie*, t. i, p. 489, edit. in 4to.

† L. l. vol. i, diff. i.

‡ Haller *Opus. pathol.* obs. xxi, p. 44, and Ruysch *Oper. omn. anat. med. chirurg.* vol. i, obs. xxxix, p. 38.

§ *Rat. Med.* pt. 3, sect. v, p. 276.

§ *Epist. ad Zimmermannum*, obs. 3, p. 26.

¶ L. l. obs. xxv, p. 49.

** Morgagni *de Sed. et Caus. Morb.* vol. ii, lib. ii, epist. xxxix, art. vi, p. 317 & 318: et Walter *Von der Einsaugung, und der Durchkreuzung der Sehnerven*, § 51.

matical tabes, the danger of death is greater or less, according to the various diseases, and their different state. In the second, if the tabes arise either from the various affections of the viscera (obstructions,) or from the destroyed tone of the alimentary canal, it can in general be cured in it's commencement; though sometimes, especially when it happens to persons addicted to drinking and venery, this species proves mortal. The third species is absolutely incurable, and always sooner or later kills: nay this species of the tabes is of so melancholy a nature, that frequently the physician cannot even palliate the complaint, especially when the passage of the food toward the bowels is precluded by an alteration in the structure of the œsophagus or stomach. It is a miserable spectacle to see, how the imperious hunger at once nauseates and longs for meat, drink, and the delicacies of life; and how the sufferers, no longer capable of swallowing the least morsel of food, their strength being totally exhausted by long fasting, at length expire in the highest degree tabid.

Thus those are carried off by tabes, whose *primæ viæ* become impervious. That a sound person, however, from whom all food should be withheld, would likewise always die tabid, is what I do not venture to assert: on the contrary it seems to me, that in such cases the manner of dying would not be certain, but would differ in different subjects; yet, that most of those, from whom all food should be withheld, would be killed; while still tolerably fleshy, by convulsions*. Though, if such persons were either of a more advanced age, or if food

* Morgagni, l. l. t. ii, lib. iii, epist. xxviii, art. v and vi: and Haller, *Obs. pathol.* obs. xxiv, p. 48 & 49.

alone were withheld, and not drink, life would often be protracted for a long time, and, at last, they would, for the most part, die tabid *. I say, for the most part, as there are exceptions to this rule: for the celebrated Voltelen relates, that a woman, who had lived on drink alone during seven years, retained considerable vigour, and would have protracted life longer, if she had not been carried off by a putrid fever †.

In fine, the fourth species, when occasioned by worms, is often soon cured, on their being discharged; whereas, if the tabes be produced by calculi, the prognosis is ominous, and the disease mostly terminates in death.

I am obliged to be silent on the cure of this disease, because it is absolutely impossible to lay down general rules for curing a distemper, which arises from so many, and such different sources. Besides I occasionally take notice of the cure of this complaint, when treating of the several disorders, of which it is an attendant.

GENUS II.

Jaundice.

JAUNDICE may be defined to be a change of the natural colour of the human body into a yellow, sometimes green, and even blackish hue.

* Ruyfch, 1. 1. t. i, obs. lxviii, p. 64: *Bouquetus, Sepulchr. anat.* t. ii, lib. 3, sect. ii, obs. 18, p. 21: and Voltelen *Diatrise Medica memorabilem Septennis apostitæ Historiam exhibens*, cap. vi, p. 118.

† Voltelen *ibidem*, capita quinque priora.

This disorder is mostly attended with torpor and lassitude; with a sense of weight, fulness, and pain, at the region of the stomach, and in the right hypochondrium, costiveness; impaired appetite; fæces of a light clayey appearance; urine thicker than usual, and tinging linen of a yellow colour.

As the theory of almost every disease has been hitherto founded either on obstructions, or acrimonies, so physicians, attempting to determine the proximate cause of the jaundice, have stated, that it is an impeded flow of the bile from the gall-bladder to the *duodenum*, for the most part occasioned by an obstruction. Cullen, however, having not unfrequently observed in persons, who laboured under the jaundice, the *fæces* of their natural colour, and even sometimes a vomiting of a bilious matter, justly inferred, that the impeded evacuation of the bile into the *duodenum* could not be, at least always, the cause of the jaundice. Yet, that he might accommodate the operations of nature to the established theory, he states, that the jaundice may be produced in two manners; either the passage of the bile toward the alimentary canal being stopped up; or the bile, when discharged into it in a greater quantity, being absorbed by the lymphatic vessels of the intestines: though he adds, that the latter cause seldom takes place*. The following arguments prove, that this opinion, even with the emendation of Dr. Cullen, does not agree with the phenomena of nature.

1, If the absorbent vessels of the vesica fellea should take up the bile, they would always absorb

* L. l. vol. iii, pt. 3, chap. iv, § 1817.

it, as there is continually a great quantity of bile in the gall-bladder.

2, As thus it is evident, that the absorbent vessels of the vesica fellea do not take up bile itself; and if, nevertheless, the impeded flowing of the bile into the *duodenum* be mostly the cause of the jaundice, as is commonly believed; it must naturally follow, that the gall-bladder would be always found preternaturally filled with a great quantity of bile in the bodies of those, who died of jaundice: but the contrary very often happens.

3, If the origin of the jaundice were chiefly to be derived from the impeded evacuation of the bile, and it's great collection in the vesica fellea, then those, who labour under the dropsy of the gall-bladder, in whom this organ is greatly distended, would be also afflicted with the highest degree of the jaundice; experience however proves, that, for the most part, not the least mark of jaundice exists in such persons *.

4, A great quantity of stones is often found in the gall-bladder, without the least mark of jaundice having ever appeared †.

5, The immortal Morgagni records many instances of the gall-bladder and it's duct having been obstructed, and entirely impervious without jaundice ‡.

* Richter l. l. seite, 59 and 60.

† Morgagni, l. l. t. ii, lib. 3, epist. 37, art. 18, 19 & 20: Haller, *Opusc. patbol. obs.* xxxiii, *hist.* vii & xi.

‡ L. l. No. 31, 32, 33, 34, and 37.

6, Richter was once witness to the highest degree of jaundice in a woman, whose colour bordered upon black, her urine dark yellow, the fœces tainted with the bile, and she was likewise attacked with a bilious vomiting; yet her body being opened, it appeared to be totally destitute of a gall-bladder *.

7, My dear friend, the learned Dr. Koole, has lately communicated to the physical society of Rotterdam † a case of a lady sixty one years of age, who, having laboured under a violent and continual fever during three days, complained of pain and tension at the region of the liver. A tumour ensued, terminating in an abscess, which being broken, three gall-stones, accompanied with a great quantity of green bile, were discharged at different times; after the discharge of which the wound was consolidated within a few days, and all the symptoms disappeared. This lady never complained of a bitter taste in the mouth; neither the whites of the eyes nor the skin had a yellow, or any other preternatural colour; the urine appeared natural, and never brown or yellow; in fine, the fœces were by no means whitened, but always tainted with the bile in the same manner as in the healthy state. This lady, having afterwards lived in perfect health for some years, was seized with an apoplectic fit, of which she died, and the body being opened, the vesica fellea appeared to be quite changed into a

* L. l. cap. ii, seite 54, 55 & 61.

† *Verhandelingen van het Bataavisch Genootschap der proefonderwindelyke Wysbegeerte te Rotterdam, eerste deel, p. 509 & seq.*

species of ligament. It is evident from this observation both that the passage from the gall bladder into the intestines may be blocked up by stones, without either disturbing the digestion, or occasioning jaundice ; and that, the vesica fellea being destroyed by disease, a person may nevertheless live in a perfectly healthy state.

8, Dr. Gibson records a case which serves to prove beyond doubt, both that the lymphatic vessels of the gall-bladder do not absorb the bile from it; and that, though it's duct be totally obstructed, no jaundice thence arises. A boy twelve years of age, by falling from a wall, had received a severe contusion in the right lateral part of the abdomen; and, after having suffered various disorders, at last died of the dropfy. The body being opened, " The
" gall-bladder was found continuous to all the con-
" cave part of the liver, and was extended to a most
" surprising bulk; for it contained no less than two
" Scots pints, or eight pounds of bile, rather
" thicker than the cystic generally is, and of which
" several concentrical bags, inclosed one within
" another, were formed; these had all the internal
" figure of the gall-bladder, and differed from
" each other only in this, that those, which were
" next to the *vesica*, were firmer, and more opaque,
" while the more internal were of a lighter green
" colour, and of a more tender substance.

" The *Ductus communis choledochus* was larger
" than usual, and was filled with many small spongy
" stones of a yellowish hue, that swam in water*."

* *Med. Essays and Obs.* vol. ii, art. xxx, p. 292 to 304.

Notwithstanding the cystic bile was prevented from passing down into the intestines, and the gall-bladder was distended by a great quantity of bile in this case, no icteric symptom was observed in the boy during the whole course of the disease. Considering all this I willingly agree with Morgagni, that, though the duct of the vesica fellea be obstructed, still no jaundice arises, unless the ductus choledochus be at the same time blocked up, which does not often happen*.

Thus the stones of the gall-bladder are to be considered as the cause of the jaundice only in as much as sometimes by irritating that viscus, they act on the organs secreting the bile, hinder the secretion, put a stop to the flowing of the bile from them by spasmodically contracting their orifices, and dispose the absorbent vessels, which are numerous in the substance of the liver itself, to take up the bile stagnant in the biliary ducts, and carry it through the thoracic duct back again to the blood.

In fine, the hypothesis of Cullen is by no means sufficient to explain the phenomena of nature. For, it is nothing more than a mere assertion, that the bile, when carried in a greater quantity to the intestines, is absorbed by the lymphatics, and thus excites a jaundice: there naturally exists a great quantity of bile in the intestines in the healthy state, and therefore the absorbent vessels may always take it up, if they be capable of absorbing the bile itself; and though it were granted, that the bile was

* L. l. art. x.

carried off from the intestines by the absorbent vessels, yet a jaundice could by no means arise from this, because this absorbed bile would still have to pass through many glands, before it could arrive at the thoracic duct; so that it would be changed into a homogeneous liquor with the other fluids, and so be prevented from producing noxious effects.

It is evident therefore, that it is not the cystic bile, as is commonly believed, but the bile of the liver alone, which produces the jaundice: this bile exerting a specific stimulating power, by which the solids are incited to such motions, that a peculiar matter called icterical is secreted; which, according to its different mode of acting, taints either the whole body, or only some part of it, with a yellow, green, or even blackish colour.

As, to produce the jaundice, it suffices, that certain determinate motions be communicated to the solids, not only from the bile, but also from many other stimuli, without the regurgitation of the bile into the blood; the vessels may be disposed in such a manner, that the whole sanguiferous system becomes changed, as it were, into an organ preparing a substance like bile. This is demonstrated by the following considerations:

1, For the jaundice to arise from the regurgitation of the bile, a certain time is necessary to convey into the blood a sufficient quantity, to dispose the vessels to the requisite motions: because the absorbed bile conveyed to the thoracic duct
enters

enters the blood only by drops, and blended with many other fluids. Hence the patients must feel disordered some days before the jaundice arises. But the jaundice may be brought on, as it were, in a moment, by terrour, anger, the bite of a serpent, and different diseases; of course, in such cases, it's cause certainly cannot be attributed to the reflux of the bile into the blood.

2, The symptoms, which foretel the approaching jaundice in other cases, such as anxiety at the region of the stomach, the pain, and sense of weight and fulness on the right lateral part of the abdomen, the loss of appetite, and the colicky pains, are mostly wanting in these cases, and the lateral parts of the abdomen are in a healthy state; which evidently shows, that no disorder either of the liver or the biliary ducts takes place.

3, There is not less difference observed between the symptoms during the course of the malady: for the *fæces* are not whitened; the body is not constipated, on the contrary, it is often more loose than usual; even bilious vomitings not unfrequently occur. Thus the passage of the bile to the intestines is by no means obstructed*.

4, Those, who labour under this species of jaundice, also require different remedies from those, which are commonly administered in this disease. For instance, when this disorder is caused by the

* Stoll l. l. pt. 3. sect. v, p. 248, & p. 256; & Burserius l. l. vol. iv, cap. xiii, p. 161.

bite of a serpent, aperient, stimulant, antispasmodic, and opiate medicines effect nothing; whereas remedies, by which the poison is enervated, and it's noxious effects prevented, are very advantageous: an evident sign, that the jaundice in these cases ought to be derived not from the disturbed action of the biliary organs, but from a noxious stimulus directly operating on the sanguiferous system.

5, In the body of a woman who died of this distemper accompanied with dropsy, Tulpius found the liver arid, black, dry, and contracted like crumpled leather, so that it was scarcely as big as the fist*. Baron van Swieten likewise observed frequently such arid and dry livers in the bodies of icterical patients†. Whence it is manifest that, whatever might have been the cause of the jaundice, yet in these cases the disorder could by no means be kept up by the reflux of the bile into the blood, but by another stimulus exciting the vascular system into motions of a peculiar kind.

6, That the jaundice sometimes takes place without the regurgitation of bile into the blood was well known to the ancients, though they had less accurately penetrated into it's cause: as they have not only recorded, that the whole skin, the saliva, and the other fluids, may become yellow without regurgitation of the bile, but besides have

* L. l. lib. ii, cap. 36, p. 151.

† L. l. t. iii. § 950, p. 143.

most accurately described the symptoms, by which these two species of jaundice may be discriminated*. An evident token, that this distinction of the jaundice is founded on the observations of nature.

The sanguiferous system, affected in a specific manner, either by the bile, or by any other stimulus, runs into irregular motions with such effect, that a bilious humour is secreted through it's whole extent.

That in reality nature proceeds in such a way, and that the yellow colour of the skin is not to be explained from the absorption of bile, but from a bilious humour secreted by the morbid action of the vessels, is proved, not only by the above observations both of Tulpus and van Swieten, in which, though the liver was dry and arid, all the parts of the body were tainted with a dark yellow colour, but likewise by cases related by Stoll, in which the duct of the gall-bladder, the duct of the liver, and the ductus choledochus, were found impervious throughout, and closed by a hard calculous matter; and nevertheless the fæces were either yellow, or æruginous†. Here no bile could proceed toward the alimentary canal, the passage being totally blocked up; yet the fæces were tinged with a bilious colour. Hence it necessarily follows, that the mucus commonly secreted in the intestines (*succus entericus*) was changed into a bilious humour by the altered action of the vessels; and that

* Bonnetus, *Thef. med. pract.* t. ii, lib. iv, cap. 49, p. 855: R. Vogel, l. l. § 633: & Burserius, l. l. t. iv, § 157.

† Stoll, l. l. pt. 3, sect. 5, obs. v, p. 153.

this fluid imparted to the fæces the above colour; which is farther confirmed from this; that, in an inveterate jaundice, as I shall afterwards prove, all the fecerned humours become infected with a yellow colour.

Now as the effects are always in the compound ratio of the stimulus applied, and the reaction of the organs depending upon the organical structure of the parts affected, it is easy to explain, why often not the whole habit, but the face alone, and especially the whites of the eyes, display a yellow colour, and why the jaundice sometimes occupies only the half of the body. Hence, too, may be explained a singular phenomenon, mentioned by Dr. Burserius, of an icterical patient, forty years of age, whose whole face to the throat was green, the right side of his body black, and the left yellow: for the same stimulus may have various effects, according to the different reaction of the organs; the same stimulus, though applied to organs of the same structure, but with an unequal force, may produce a difference in the symptoms; and all the species of the jaundice only differ in their degree. From the same source ought also to be derived the reason, why all the fecerned humours are mostly found in a natural state in the commencement of this disorder the urine alone excepted; and why the infant may generally suck the breast either of a mother, or a nurse, who labours under the jaundice, without the least injury*: for the organization of the other fecerning

* *Act. serv. Civib. dicat.* t. xii, p. i, § 20, p. 13.

organs prevents them from being so easily altered by the noxious cause, as the urinary organs; and the reaction of the vital powers always in part expels from the body the morbid matter, the excretion of which is mostly performed by the urine. However, when the jaundice has either continued for a long time, or proves very severe, the saliva, sweat, fat, in a word, all the secreted humours acquire a yellow colour, and the muscles, the viscera, the cartilages, and the bones, become yellow *. Even the blood is at times totally changed into a bilious humour, as it were; some cases of which are mentioned by Morgagni †.

When once the jaundice is produced, the secreted bilious matter continually stimulates the solids: therefore the *natura mediatric* directly attempts it's expulsion; and hence originates the turbid, croceous, or dark yellow urine, observed in this disease. And by these means the jaundice often spontaneously disappears, when it's cause is easy to be removed: whereas this disorder, though seeming to be cured, sometimes returns at several intervals; which phenomenon seems to me to be owing partly to this, that the stimulus, which disposes the solids to the secretion of a bilious liquor, operates only by paroxysms; but chiefly from this rule of nature, that, if the jaundice repeatedly attack a person, the disposition to prepare a bilious humour at a certain period becomes, as it were, impressed on the vascular system.

* Vogel, *Præl. Acad.* § 632, p. 528; Burserius, l. l. vol. iv, cap. xiii, § 160; & Stoll, l. l. pt. 3, sect. v, obs. vii, p. 259 & 260.

† Morgagni, l. l. t. ii, lib. iii. epist. xxxvii, n. vii: & Vogel, l. l.

The prognosis of the jaundice differs according to it's various causes. In general, when it arises in a sound body from the regurgitation of the bile into the sanguiferous system, it never brings on death: those cases alone excepted, where the jaundice is produced by an obstruction of the ductus choledochus, in which life is destroyed, unless the stone, by an ulcerating process, makes it's way into the duodenum, or the duct becomes so dilated, that the bile can freely pass by the stone into the alimentary canal. But if this disorder be generated by any other stimulus without the regurgitation of the bile, no general rule can be laid down as to it's termination; because the jaundice is then almost always complicated with some other disease, and very often is only a bad symptom of it. In general this species is more dangerous than the other arising from the regurgitation of the bile. The fever especially, which frequently accompanies this kind of jaundice, is always ominous. Stoll has observed the jaundice, when attended with fever, either fatal, or very dangerous*: and this is confirmed by the observations of Burserius and Graewen†.

I have twice had an opportunity of observing the jaundice attended with fever. In both cases the whole body was of a dark yellow colour; objects appeared yellow; the fœces were tainted with the bile in the usual way; the appetite was much stronger than natural; the patients were walking

* L. l. p. 244, et seq.

† Burserius, l. l. t. iv, cap. xiii, p. 458: & *Act. serv. Civib.* l. l. p. 127.

about for a long time, and did not believe the danger they were in. They became however gradually weaker; and died at length hectic. It ought here to be observed, that every jaundice which succeeds a fever is not symptomatic; for it may sometimes arise from a disturbed crisis. Hence Hippocrates pronounces the jaundice dangerous, when happening in fevers before the seventh day of the distemper*; as the crisis commonly arrived at this time. When the jaundice is critical, the patient finds himself greatly relieved by it; when it is symptomatic, he is on the contrary much worse.

The jaundice arising either from the regurgitation of the bile, or from some other stimulus, is cured by a turbid, thick, and copious urine; by a thick, fetid, and yellow sweat; by a looseness; by the hemorrhoids, by a translation of the disease, to some organ†; by a scarlet or miliary fever‡; or by the eruption of a peculiar substance, resembling, as it were, calculous grit, which truly singular event, observed by the celebrated Voltelen, is described by Dr. Groen. A certain lady, having laboured under various disorders, fell into a periodical jaundice, the cure of which was in vain attempted by aperients, demulcents, carminatives, antispasmodics, and opiates; to all which remedies the jaundice proved obstinate, and the patient became daily more and more enfeebled. Dr. Voltelen, attending the lady, conceived the idea, that a stone

* *Aphorif. sect. iv, aphor. 64.*

† Stoll, *Rat. Med.* l. l. obs. 18, p. 276.

‡ Stoll, l. l. obs. ii, p. 267.

in the gall-bladder was the cause of the jaundice. Accordingly, having first strengthened the patient a little, he gave her the famous remedy of Dr. Durande, composed of equal parts of vitriolic ether, and oil of turpentine. During the use of this, first pains arose in different parts of the body, particularly at the wrists; and afterwards some calculous matter was deposited at these places, with great relief to the patient. Accurate observation taught Dr. Voltelen,

“ That such a deposition occurred after every new
 “ paroxysm of the jaundice; that a violent itching
 “ constantly preceded it in the parts where it was
 “ to take place; at length a small yellowish pimple
 “ was observed, which greatly increased both in
 “ bulk and solidity; and the pimple, when acci-
 “ dentally opened in the beginning, before it had
 “ acquired consistence, discharged a viscous, tena-
 “ cious, yellowish, and acrid matter, which cor-
 “ roded the surrounding skin. This deposition
 “ happened chiefly at those places, where the parts
 “ had been constricted by pressure. Thus, for
 “ instance, the ring finger showed first a circle
 “ marked with a yellow humour, and afterwards
 “ surrounded, as it were, with a certain incrusta-
 “ tion. In the mean time the urine deposited a
 “ copious arenaceous and yellowish sediment for
 “ many days. The paroxysm could sometimes be
 “ prevented by hard riding on horseback, a large
 “ quantity of thick turbid urine being discharged
 “ in consequence for some days, and the cutaneous
 “ eruption appearing at the same time. No stone
 “ was discovered either before or after. The erup-
 “ tion totally ceased during the continued use of
 “ this remedy: however a yellowish, thick urine,

“ full of an arenaceous sediment, was continually discharged *.”

From these symptoms Dr. Groen concludes, that a stone of the gall-bladder existed in this case; which, being resolved by the above remedy, was carried to the surface by a salutiferous effort of the vital powers. However, though I do not deny, but that almost all the symptoms, which commonly attend the stone in the gall-bladder, existed in this case, many reasons prevent me from agreeing with Dr. Groen. In the first place, we have hitherto no certain sign by which we can judge of the stone in the gall-bladder; and every token of it may deceive, as the doctor himself observes †. In the second place, the more I consider the history of the disease, the less can I believe, that a stone in the gall-bladder was the cause of this jaundice: for we have already observed, that stones in the gall-bladder, though rendering it's duct totally impervious, never produce a jaundice, except by disturbing the action of the biliary ducts. Now if a regurgitation of bile be produced by the irritation of the stones, it is true a jaundice arises: but the patients always exhibit, more or less, an icterical countenance; as the irritating cause never ceases in these cases ‡. Some physicians relate, indeed, that they have observed a periodical jaundice from stones in the gall-bladder. This asser-

* *De Calculorum Genesi*, p. 60, et seq.

† L. I. p. 65.

‡ Bianchi, *Historia hepatica*: and *Med. Essays and Obs.*, vol. ii, art. xxvii.

tion, however, seems to derive it's origin from a mere hypothesis, and by no means to be founded on the observation of nature: for it is beyond all doubt, that stones in the gall bladder often exist without occasioning the jaundice; therefore I do not comprehend with what right stones in the vesica fellea can be deemed the cause of the jaundice, in the cases where they accompany this distemper; since there is not the least reason, why the jaundice may not arise as well in patients, who labour under stones of the gall-bladder, as in healthy persons, from the operation of a morbid stimulus. Thus it seems to me highly probable, that the periodical jaundice in these cases did not owe it's origin to stones of the gall-bladder, but to another morbid stimulus: since stones in the gall-bladder by themselves never cause the jaundice; and when they do occasion it by disturbing the functions of the biliary organs, the disorder always remains, till it's cause is removed.

Let it not be argued, that morbid causes, though constantly remaining, very often produce periodical diseases; as is proved by the intermitting fever, the epilepsy, and many other disorders: for the modification of these distempers depends both upon the difference of the morbid stimulus, and the reaction of the vital principle; so that, for instance, according to the different acting of the noxious power, and the reaction of the vital principle, either a quotidian ague, a tertian, a quartan, or a continual fever is produced. But it is a quite different affair with stones in the gall-bladder. These, when occasioning the jaundice, produce it only by

disturbing the action of the biliary ducts in consequence of their sharp points: thus as long as this cause exists, the jaundice also proves incurable. This cause is only to be removed by the absorption of these sharp points by the lymphatic vessels; which, however, seldom happens, both on account of the total alteration of the structure of the gall-bladder, and because new strata are daily adding to the stones.

It may, perhaps, be objected, that even by the strata, which are daily added to the stones, their sharp points must at last become blunt, and consequently the jaundice must disappear. But that this objection is of no weight will readily appear on considering, that, even though it were true, that by the addition of fresh strata the sharp points grow blunt, the jaundice would indeed disappear, but a periodical one would by no means be produced. Nobody, surely, will venture to maintain, that a jaundice periodically returning, for instance, every month, may be explained from this source. Besides, this objection does not agree with the phenomena of nature: for that the sharp points of stones in the human body by no means grow blunt by the addition of fresh strata is put beyond all doubt, by numerous instances of those who labour under the stone of the urinary bladder. It is commonly known, that the sharp points, which are frequently met with in stones in the urinary bladder, occasion the most acute pains to the patients; and it is not less certain, that though these stones daily increase by the addition of fresh strata, nevertheless the pains, instead of being lessened by the growth
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of the stones, grow daily worse and worse, and that, unless the stone be either extracted from the body by lithotomy, or the action of it's sharp points prevented by rendering the internal coat of the bladder insensible, and, as it were, callous to the morbid stimulus by the use of medicines, the physician is obliged continually to administer opium, to abate the rending pains caused by them. Therefore, as the intermitting fevers and epilepsy are periodical diseases, only because their noxious power operates at intervals; and they have different paroxysms, according to the different intermission of the morbid stimulus; so the jaundice, when arising from gall-stones, must prove perpetual, on account of the continual irritation of the stones.

Thus it is requisite to jaundice, arising from a stone in the gall-bladder, that the patients have an icteric countenance, in a greater or less degree, from the commencement of the disorder till it's termination. At least no case proving the contrary has hitherto, as far as I know, been published. But the jaundice disappeared at the cessation of the paroxysm in the above case. Moreover the approaching paroxysm could sometimes be prevented by a hard ride on horseback: yet no one will venture to assert, that a ride on horseback has the power of preventing a stone in the gall-bladder from bringing on the jaundice by it's irritation. It is evident, too, from the whole history of the disease, that the patient was already weakened by different disorders, before he was afflicted with the jaundice; of course it is
highly

highly probable, that in the above case the jaundice, generated once or twice by accidental causes, had at length impressed on the vascular system a disposition to prepare a bilious fluid at a certain and determinate period; the more, as, according to the observations of practitioners, the jaundice becomes, as it were, a habitual disorder, if a person labour under it more than once. Lastly, if we inquire a little more accurately into the eruption itself, how great an analogy do we not find between this, and the other exanthematous eruptions! So great, indeed, that no difference exists between them, excepting what regards the consistence of the matter secreted. When treating of the exanthematous diseases, I proved, that in them the morbid matter, separated from the blood and deposited at the surface of the body by the vital powers, is farther subdued by the secreting vessels, which afterwards prepare a peculiar substance from it. Now the symptoms being the same, may it not with justice be concluded, that likewise in this case the bilious matter was separated from the blood by a peculiar action of the solids, incited by the remedy prescribed; and that this manifested itself at the surface under the forms of pimples turgid with a yellowish acrid matter? For, that this matter quickly changed into crystals, or bilious concretions, demonstrates nothing but that the action of the vessels was already so vitiated, that bile of a depraved nature, and soon crystallizing, was secreted instead of healthy bile. The success, with which the famous remedy of Dr. Durande was given, is equally far from proving in the least the existence of a stone in the vesica fellea. For,

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though I readily agree, that, both in the periodical jaundice, and in this disease when occasioned by gall-stones, some precautions being observed, nothing is better, than this remedy on many occasions; yet I do not hesitate to assert, that it is as little capable as other remedies of resolving a stone in the gall-bladder. Bilious concretions no doubt have sometimes been discharged by stool after it's use: but Cullen observes, that the same not unfrequently happens after using emetics*; Dr. van der Wyperffe confirms this by a remarkable instance†. And van Swieten relates, “ That he cured a woman, sixty years of age, who had laboured under the jaundice during twelve years; which, periodically returning in the beginning, continually remained during the last year; by a long continued use of resolvents, especially the juice of the dog-grass, whey, and soap; by which,” I employ his own words, “ at length this infarcted matter of the liver began to be resolved, and a looseness ensued for six whole months; an extremely fetid argillaceous matter, intermingled throughout with small sharp calculous granules, being discharged, with relief of all the symptoms‡.” If, therefore, it were to be concluded, that all the remedies, after the use of which bilious concretions appear, operate by resolving stones in the gall-bladder, the faculty of resolving these stones ought to be imputed not only to the vitriolic ether, but also to emetics, and even to the mildest

* L. l. § 1825, p. 445.

† *Act. servand. Civib.* t. xiii, pt. i, p. 284.

‡ L. l. t. iii, § 950, p. 130.

apcrients. But who will maintain, that emetics have the property of dissolving stones in the gall-bladder? Who would affirm, that dandelion, the gramen caninum, whey, and soap, possess such virtue, that, after being conveyed through the whole body, they are still able to resolve inveterate bilious concretions? Will not every one, attending to all this, willingly grant, that the discharge of these stones is rather to be imputed to a salutary effort of the vital powers, roused to action by the above medicines? But, that the least doubt may not remain on this subject, I shall directly demonstrate, the absolute impossibility of resolving a stone in the gall-bladder by any medicine. Every medicine is first received into the stomach, and undergoes it's action: it is thence transmitted to the intestines, and, being there altered anew, it is at length taken up by the lymphatics. After being absorbed by these, it has still to pass through many conglobate glands, where it undergoes a great change; which is wisely ordained by nature, that, in case the elective faculty of the orifices of the absorbent vessels should chance to be deceived, noxious substances, though absorbed, might thus be prevented from mixing with the blood, without a previous assimilation. Thus blended with many other fluids, it enters the thoracic duct, and is mixed with the blood by drops: till at last, having circulated with the blood through the whole body, it is conveyed to the gall-bladder. Now though I willingly grant, that many remedies specifically operate on some particular organ by a kind of sympathy; though I likewise allow, that medicines are only in part altered, and cannot be wholly changed by the vital powers; yet

is it to be believed, that a medicine, which undergoes so many changes in the *primæ viæ*, and which, before it arrives at the destined part, must pass through so great a number of vessels, all possessing the faculty of altering the nature of the humours contained in them, would still possess a sufficient power chymically to resolve the stone itself? In reality this seems to me quite contrary to sound reasoning. But, on the other hand, granting, that in fact a medicine could exist strong enough entirely to escape the action of our organs, what would be the consequence of it's use? It would enter the blood unaltered. Now consider only what effects any medicine, capable of chymically dissolving calculous concretions, must have on the blood-vessels themselves, the structure of which is certainly far more delicate than that of bilious stones; must it not be much apter to corrode, and totally destroy their organical composition? Indeed nothing less could be expected from such a medicine, than death amidst universal convulsions. I conclude therefore, that, though several solvents of biliary concretions out of the body have been discovered, yet there is not the least probability, that they could reach these concretions while lodged within it.

Let it not be argued, that medicines able to dissolve a stone in the urinary bladder are not wanting: for I am perfectly satisfied, that it is likewise impossible to dissolve a stone, when existing in the urinary bladder. I know indeed, that the mephitic water has acquired great celebrity in the present day; and that when this medicine has been administered to persons, labouring under a stone of the

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bladder,

bladder, especially in the commencement of the disease, all the symptoms of this grievous disorder not unfrequently disappear; and by it's use such persons are afterwards enabled to enjoy a tolerably healthy state during many years. But I know also, that in the bodies of such persons the stone was always found intire: an evident token, that this medicine by no means operates by chymically resolving the calculous concretion. It must be confessed, it is of great utility in the calculous gravel, by preventing the formation of the stone; and in the stone itself, by abating or removing the tormenting symptoms of the disorder, on account of a specific action it seems to have on the urinary organs, which renders the fresh strata added to the stone of a soft spongy texture, instead of a hard calculous substance, and consequently prevents the stone from irritating the internal coat of the bladder. That this is really the case, has been proved beyond dispute by the celebrated Mr. Cline, surgeon and lecturer on anatomy and surgery at St. Thomas's Hospital, by a great number of specimens taken from patients, that died during the use of this remedy.

Even the cases related by Dr. Durande demonstrate, that this remedy does not operate as a chymical menstruum, but in a quite different manner. For he mentions, that the fragments of the stone were discharged by stool in some subjects, but not in others; and that it proved equally successful in both cases*; which evidently shows, that this me-

* Murray, l. l. vol. i, p. 29 & 30.

dicine operates on the jaundice itself, and by no means resolves the stones of the gall-bladder. With respect to the fragments of stones observed by Dr. Durande in some patients, I greatly question, whether these apparent fragments are not rather to be looked upon as so many different stones; the analogous structure of them all might easily lead Dr. Durande at the time into a mistake: at present it is demonstrated by the celebrated Soemmering, that stones of the gall-bladder are always of a similar structure in the same person*.

From what I have proved, the following general inferences result:

1, That the jaundice was not ingendered by a stone in the gall-bladder in the above case.

2, That stones in the animal body can be resolved neither by vitriolic ether, nor by any other medicine.

3, That, notwithstanding, the vitriolic ether may be given in many cases of the jaundice with the greatest expectation of success: nay, that it often promotes the passage of the stone itself, by removing the spasm of the duct of the gall-bladder through it's eminent antispasmodic virtue.

The general indications of cure in the jaundice are the three following:

* Soemmering *de Concrementis biliaris Corporis humani*, § xvii, p. 35.

1, The morbid cause, which has brought on the disease, is to be removed; or, if it be not removeable, at least a stop must be put to it's action.

2, Such a disposition ought to be excited in the solids, that they may separate the bilious matter from the blood, and expel it from the body by the emunctories; and, if the disposition to secerne a bilious humour at certain intervals be impressed on the solids, it must be abolished.

3, Tonics should be given to prevent any relapse of the disease.

But though these indications are to be observed in every jaundice, yet the remedies, by which the first indication is to be accomplished, ought to be very different, according to the different morbid cause. Hence if the jaundice arise from fordes of the *primæ viæ*, emetics and purgatives are sufficient to the cure. If the disease be occasioned by excess of irritability, opium, small doses of ipecacuanha, extract of belladonna, and the warm bath, are to be prescribed. If a periodical jaundice be produced by a spasmodic constriction, as is sometimes observed in hysterical and hypochondriacal persons, it is to be cured by frictions; and by valerian, the ferulaceous gums, especially the asafœtida, and other remedies of this kind, taken internally. In each of the last two cases a blister applied to the abdomen is also found very useful. When the disorder arises from the retropulsion of some morbid matter, the spiritus Mindereri, crude antimony, the woody-nightshade, opium joined with ipecacuanhã, an infusion of the last, &c. are beneficial. If the disorder be produced

duced by a morbid state of the viscera (obstructions), aperients are requisite, which should be of a more or less stimulant nature according to the circumstances. It should be observed, however, that their use must not be too long protracted; for though aperients are efficacious in the commencement of the distemper, yet, when too long continued, by weakening the body too much, they not only prevent the jaundice from being cured, but, on the contrary, promote the disorder, and render it daily more and more obstinate.

When the jaundice is produced by stones, the *natura medicatrix* must perform the principal part of the cure; by the salutary efforts of which the biliary ducts become so dilated, that either the bile again freely passes into the duodenum, or the stones themselves descend into the alimentary canal through the dilated ducts, and are thus discharged by stool; which is not to be wondered at, as Morgagni has demonstrated by many instances, that the dilation of the ductus choledochus is often very great*. It is the business of physic to assist these efforts of nature by a repeated, but prudent use of emetics†; and by the use of the vitriolic ether, combined with an equal portion of oil of turpentine, which last medicine principally agrees with weakened and irritable bodies from its stimulant, and antispasmodic power. Opium and the warm bath also prove salutary. The lixivium saponarium has likewise been used with success. Another

* L. l. *epist.* xxxvii, art. 46 & 47.

† Cullen, l. l. § 1825 and the following.

medium, by which nature gets rid of the stone, is by exerting inflammation in the neighbouring part of the duodenum, which, terminating in an ulcerating process, the stone is expelled the body by stool. If no material cause of the jaundice appear, opium and other anodynes, and antispasmodics and demulcents are to be employed, both externally and internally, to diminish the action of the morbid stimulus; which they not only do, but often effect a radical cure, as the illustrious Richter has proved by many examples*.

The second indication is very often answered by accomplishing the first: at the same time mild diaphoretics and diuretics may be given at bedtime with great advantage.

If the disposition to the jaundice be impressed on the solids, the remedy of Dr. Durande, consisting of vitriolic ether, joined with an equal quantity of oil of turpentine, proves the most powerful, which, therefore, what was necessary being premised, should never be omitted.

As torpor of the vital principle, for the most part, accompanies this disorder, in a greater or less degree, it never requires bleeding of itself; but, on the contrary, both the former indications being answered, the physician ought to have recourse to bitters, the bark, and preparations of iron, to strengthen the general habit; and even in many cases it proves useful to join tonics with aperients from the commencement of the disorder.

* L. I. kapitel ii, p. 66.

When the jaundice proves incurable, in that kind of the disorder that is attended with a fever, an inflammation of the liver often ensues, in which case patients are killed either by the violence of the inflammation, by the gangrene succeeding to it, or by the suppuration of this organ, in the last of which cases they generally die tabid. However, if, as is not seldom the case, this kind of jaundice be only a bad symptom of another disease, life is extinguished in different ways, according to the different disorder, which the jaundice accompanies. In the chronic jaundice, which most frequently occurs, and is unattended with fever, when the disease is inveterate, either a dropfy takes place, or the organical structure of the liver is entirely destroyed by the continually irritating morbid stimulus. In the first of these cases, according to the testimony of Ludwig*, no hope of recovery remains: and, indeed, if we consider that the dropfy in such cases owes it's origin to the relaxed tone of the whole body, and to the alteration in the structure of the abdominal viscera, it will readily appear, that but very small hopes of cure can exist. Life, however, is often protracted for some weeks; but, at length, sooner or later, according to the different states of the patients, and their different ages, death closes the scene; and, as far as I know, no instance of a recovery from a confirmed jaundice, combined with a dropfy, has hitherto been seen. In the second case, a tabes, accompanied with a hectic fever arises, and life is taken away in the same manner, as in the tabes itself.

* *Instit. Therapeuticae generalis*, pt. ii, tract. 3, cap. vii, § 848, p. 397 & 398.

G E N U S III.

Dropfy.

THE dropfy is a collection of a ferous fluid either in some particular part of the body, or over the whole surface, mostly attended with swelling, thirst, difficulty of breathing, costiveness, and a paucity of urine.

The three chief species are, ascites, anasarca, and hydrothorax. *Ascites* is either a regular soft uniform tumour of the whole abdomen, with a sufficiently evident fluctuation; or a partial tumour of the abdomen, mostly attended with an obscure fluctuation. In the latter case the disorder is denominated encysted dropfy. The *anasarca* has it's seat in the cellular membrane. It may be either universal or particular; and is characterized, at least in the beginning, by soft, white, cold, indolent, and scarce elastic tumours. The *hydrothorax* is often very difficult to be discovered, and has, strictly speaking, no characteristic symptoms. The disorder, however, is mostly attended with dyspnœa, pallid countenance, œdematous swellings of the feet and hands, a tumefaction of the scrotum with relief of all the symptoms, little urine, difficulty of lying down, sudden starting from sleep, palpitation of the heart, irregular pulse, and sometimes a fluctuation of water in the chest.

It is not my purpose separately to speak of every species of this disease; I shall only treat of dropfy in general, and lay down some rules regarding it's causes, prognosis, treatment, and manner of killing. This general review of dropfy is the more sufficient, as, though some cautions are to be observed, according to the different parts, in which the watery collection takes place, yet the indications of cure always remain the same, and, under the same circumstances, the hydrothorax requires nearly the same treatment as the ascites and anasarca; so that the difference of cure in dropfy, for the most part, does not depend upon the difference of the part affected, but upon the various causes, which have brought on the disease. Ascites may be distinguished from the tumour of pregnancy, by the want of the usual signs of the latter; as amenorrhœa, enlargement of the breasts, the change of the areola, gradual enlargement of the abdomen, and quickening; and by the countenance of the patient, the general state of the system, the small quantity of urine discharged, thirst, and the sense of fluctuation.

The dropfy may arise from two opposite states of the body; increased action, and debility. In the first, the disease is brought on either, when an inflammation terminates in a serous effusion; or when, on account of the plethora, the equilibrium between the sanguiferous vessels and the blood being destroyed, an apparent debility of the whole system is induced: for, unless this be removed by bleeding, the vessels at length yield to the pressure of the column of blood, and an effusion of a serous

humour by a diapedesis takes place. In this case the dropfy is produced by an apparent torpor of the vital principle; or by a suppression of the functions by the superabundant blood, by which both the effusion of a ferous fluid is produced, and the lymphatic vessels, from the languor of their *vita propria*, are prevented from taking up the effused fluid.

The dropfy originating from debility is commonly believed to be owing to diseased viscera (obstructions); though, in reality, the morbid state of the viscera seldom produces this disorder; indeed, that the degeneracy of the viscera, when observed in dropfy, except in people, who have been in the habit of daily intoxication, is generally the effect and not the cause of the complaint, is particularly manifest from the ascites: for all the symptoms usually accompanying diseased viscera are for the most part entirely wanting in the commencement of this disease, and only appear towards the end of it; an evident token, that they are to be looked upon as the effects of the dropfy, and by no means as it's cause. Nay it is not uncommon, that, even at the first tapping of the patient, all the abdominal viscera are of their natural size and softness; while at the next, the omentum is not unfrequently felt of a preternatural thickness; and at the following the lateral parts of the abdomen, which in the beginning of the disease appeared in their natural state, exhibit an indurated and enlarged liver and spleen. These phenomena so often occur, that every surgeon, who has paid due attention to his dropfical patients, must be aware of them. Besides persons labouring

labouring under scirrhusity of the viscera in general are not afflicted with the dropfy. Tissot, Du Verney, and others, found the liver quite scirrhus without the least symptom of dropfy ever appearing during life: I myself have had an opportunity of inspecting several bodies with a diseased state of the liver; but in none of them did I meet with a collection of any fluid; which evidently shows, that, when the scirrhus state of this organ is combined with dropfy, it is the effect, and by no means the cause of the disease. The morbid state of the viscera (obstructions), however, may sometimes, as an occasional cause, excite dropfy; as well as aperients, when too long continued to cure this morbid state, by weakening the whole body, and particularly the absorbent system, may bring on a predisposition to it. In fine, I do not deny, but that this disease may sometimes arise from the degeneracy of the mesenteric glands*; which would more frequently happen, if the neighbouring glands did not perform the functions of the diseased ones, and such glands, for the most part, still remain pervious†.

The cause of dropfy, as Richter, to whom the art of physic is obliged for many discoveries, has clearly demonstrated, is, for the most part, a stimulus, which operating on the absorbents, throws them into irregular motions, and thus prevents the lymphatics from performing their usual functions.

* Mascagni *Prodrome d' un Ouvrage sur le Système des Vaisseaux lymphatiques.*

† Soemmering *de Morbis Vasorum absorb.* § 48, p. 231.

Now as the more the body is weakened, the more easily it is affected by the morbid powers, it is easy to be understood, why women and weak subjects are more liable than others to this disease. Debility alone, however, does not suffice for producing dropfy; and, on the contrary, dropfy may sometimes attack strong and vigorous bodies, if the noxious stimulus, acting upon the lymphatic system, be sufficiently violent. This was already observed by the learned Vogel; who remarks, that, though the immediate cause of every dropfy is believed by most physicians to be an atony or relaxation of the whole system, nevertheless many cachectical persons are entirely free from the disorder; whereas those, who labour under the encysted dropfy, are often hearty enough, and remain free from all cachexia for a long time*. What is asserted here of the encysted dropfy holds likewise good with respect both to the anasarca and the ascites; though not so generally with respect to the last, in which a fallow countenance often occurs even at an early period of the disease.

Thus it appears, that the remote causes of dropfy are numerous; that the predisposition to this disease consists in a real or apparent debility, either of the system at large, or of the absorbent vessels; and that the occasional causes all operate by communicating too great irritability, either to the general habit, or to the lymphatic system. The proximate cause of course seems to be a certain degree of debility joined with a morbid increased irritability.

* L. l. § 656, p. 555.

The prognosis differs according to the different causes of the disease, the different seats of the complaint, it's continuance, and the habit of the patient. The dropfy originating from suppressed perspiration is more easily cured, than that which happens after large evacuations. There is usually greater hopes of cure in the anasarca, than in the ascites; and the hydrothorax is the most difficult to be remedied. In recent cases the prognosis is much more favourable, than where the viscera are diseased in consequence of the disorder. A fallow or jaundiced complexion is more ominous, than when a sufficient degree of strength is still left.

The cure of dropfy is to be attempted from three general indications.

1, The exciting causes of the disease are to be removed.

2, The collected fluid should be evacuated.

3, The tone of the habit in general, and of the absorbent system in particular, is to be restored, by the exhibition of bitters, cinchona, preparations of iron, cold bathing, and moderate exercise.

The removal of the remote causes of the disease is to be accomplished by different remedies, suited to the nature of the exciting cause.

When the dropfy is the consequence of an inflammation, the neutral salts, nitre, cream of tartar, and decoctions of dandelion, grass, and parsley-roots, prove useful, supposing the patient to be
young

young and of a vigorous constitution, and the inflammation to have been a true phlegmonic one. But if the patient be either of a relaxed habit, or of a more advanced period of life; or if the inflammation have been of an obscure chronic kind, as is frequently the case in the dropfy of the thorax; the digitalis is the most powerful remedy to expel the serous collection; and afterwards the system should be strengthened by bitters, bark, and steel, to prevent the water from accumulating again.

If the dropfy be produced by plethora distending the sanguiferous vessels beyond their tone, without any previous inflammation, the mild diuretics above-mentioned will likewise prove useful: but venesection, and a low vegetable diet, are generally to be combined with them; for if bleeding be neglected, though the dropfy may be cured, yet the patients frequently die of an apoplectic fit amid convulsions*. Such persons very seldom stand in need of tonics. The dropfy originating from increased action does not bear the use of the squill, the tonic pills of Dr. Bacher†, colocynth, elaterium, jalap, scammony, and gamboge; they always make the disease worse, and occasion not unfrequently the death of the patient, on account of their violently operating on the system.

From what I have said, it is evident, that some modern authors have gone too far in asserting, that the dropfy in all cases originated from a weakness

* Stoll, *Rat. Med.* pt. 3, sect. iv, cap. vi, p. 203—214.

† Consisting of an ounce of extract of black hellebore, prepared in a very oporose way, the same quantity of aqueous extract of myrrh, and ten scruples of powdered cardus benedictus.

and relaxation of the general habit ; as in the inflammatory species a radical cure is often accomplished by bleeding and mild diuretics.

The dropfy owing to debility, which is much more frequent than the former, may be produced by a variety of causes, to the nature of which the treatment of the disorder should be adapted. If the morbid state of the abdominal viscera (obstructions) be the exciting cause of the disease, it would be a fair case for giving the tonic pills of Dr. Bacher, were not the healing art provided with other remedies far more powerful than the incongruous and difficult preparation of these pills. Surely after modern chymistry has rendered medical gentlemen better acquainted with the constituent parts of the various preparations of the materia medica, no one, supposing these pills were really of some utility, would prepare them according to the prescription of their author. But at present it is clearly proved by experience, that the volatile part of the black hellebore, merely to destroy which the doctor recommends this expensive preparation, is not only harmless in those cases, in which the use of the black hellebore is advisable, but also greatly contributes to the cure of the disease. It is true Dr. Bacher has written, that great benefit was to be derived from his pills by their operation both by stool and urine, but unfortunately these effects have not been supported by experience. Quarin, who has had frequent opportunities of trying these pills, records, that during their use the patients became very often costive ; and that they experienced much more benefit from the infusion of the black hellebore

hellebore joined with bitters, or from it's extract, than from the tonic pills of Dr. Bacher *. I have pretty often seen these pills given in almost every kind of dropfy both of the thorax and abdomen, but I never knew a single patient recover by their use. In most cases costiveness was the only effect to be observed from them; and though in some instances the secretion of urine was increased, and the patients seemed to experience some relief, yet the benefit was only temporary, and afterwards the disorder grew worse. Therefore as these pills are much more expensive than the other preparations of black hellebore, and are very uncertain in their operation, they justly deserve to be rejected, and aperients of the stimulating kind, such as the gums, bitters, and the decoction or extract of the black hellebore, should be substituted in their stead. If from hard drinking, as an alteration in the structure of the mesenteric glands, and a chronical inflammation of them, are mostly combined with it in these cases, together with a relaxation of the general habit, the complaint is very seldom cured. Strongly stimulating remedies prove generally pernicious: the cooling aperients, mild diuretics, mercurius dulcis, a nourishing diet, a moderate use of wine, and exercise on horseback, are to be recommended, in order, if not to cure, at least to palliate the disease. Dropfy for the most part originates from a morbid stimulus, disturbing the action of the lymphatic system. This stimulus should be removed; and, if we be unacquainted with it's nature, diuretics, joined with antispasmodics and opiates,

* *Animad. pract. in Diver. Morb. cap. viii, p. 109 & seq.*

are to be given. If from repelled cutaneous eruptions, camphor, Dover's powder, antimonials, and the dulcamara, are the most efficacious remedies. If from suppressed perspiration, diaphoretics, diuretics combined with opiates, and blisters, usually accomplish the cure.

But though no doubt in dropsy, as in all other maladies, the practitioner ought to pay the strictest attention to the exciting causes in the treatment of the disease; yet it is to be observed, that the remote causes of dropsy are very often such as have been removed long before the disorder came on. For instance, when the dropsy happens after large evacuations of different kinds, but especially after hemorrhages, or after long protracted fevers, though the causes have ceased to act, still their effect, the dropsy, remains, in consequence of the debility and relaxation of the general habit produced by them. The dropsy likewise originates not unfrequently from certain diseases preceding it; the curing of which is always a matter of difficulty, and requires some length of time. Now though it is a fact, that a radical cure cannot be obtained but by the remedies particularly adapted to the morbid state, of which the dropsy is the effect, and is to be despaired of without the removal of this state, yet it is evident, that nothing can be done for the radical cure of the disorder, previous to the evacuation of the serous collection; for the urgent symptoms not only often require immediate relief, but the remedies by which the radical cure is to be attempted frequently cannot effectually operate,

operate, before the water is discharged from the body.

The evacuation of the serous fluid is to be effected either by a surgical operation, or by the employment of emetics, drastic purgatives and diuretics, a great number of which are recorded by the various writers on the subject. But most of them are silent on the various circumstances, under which these different remedies are efficacious, and *vice versa* when they prove pernicious; though, as Cullen justly remarks, “ none of them, especially of
“ the diuretics, are of very certain operation, neither
“ is it well known, why they sometimes succeed,
“ and why they so often fail; nor why one medicine should prove of service, when another does
“ not; and that it has been generally the fault
“ of writers upon the practice of physic, to give
“ us instances of cases, in which certain medicines have proved very efficacious, but neglect
“ to tell us, in how many other instances the same
“ have failed *.” As this author, however, is as far from laying down any thing certain on the subject as the rest; and it is of the greatest moment in the dropsy, to distinguish well the circumstances under which different medicines are useful, from those under which they are pernicious; because neither in this malady, nor in any other, does a remedy exist, which can possibly be always attended with success; not to say, which does not hurry on the fatal termination of the complaint under some circumstances; I shall attempt, from a comparison of the observations of different practitioners on

* L. 1. vol. iv, § 1684.

these medicines, and from my own experience, to lay down some general rules on the use of those remedies, which are chiefly recommended for the evacuation of the accumulated serous fluid.

In attempting to evacuate the water, the practitioner should always pay the strictest attention to adapt the remedy to the constitution. Hence, if the patient be of an irritable delicate habit, tense fibre, florid complexion, and warm skin, an aqueous solution of the cream of tartar, the decoctions of parsley root, dulcamara, grass root, &c., generally answer the purpose. Upon this occasion however I cannot help expressing some doubt as to the diuretic power of these remedies. I believe, that their efficacy is chiefly owing to the quantity of water given along with them; and I am very much disposed to think, that upon trial they would hardly be found more powerful than drinking a large quantity of common water: for they prove successful only in cases, where the system is susceptible to slight stimuli; and in all others, where a stronger stimulus is requisite to rouse the absorbents to action, they usually fail; at least they have invariably proved unsuccessful in all other cases, in which I have seen them used. If, however, the cream of tartar be combined with a fifth or sixth part of borax, it seems then really to be a powerful diuretic. If the patient be of a phlegmatic temperament, lax fibre, pale countenance, of a cold white skin, with feeble, soft intermitting pulse, the swelling of the abdomen soft to the touch, and the anasarcaous limbs readily pitting, recourse should be had to the fox-glove. And surely under such circumstances this

remedy deserves to be preferred to all others; for it considerably promotes both absorption and the secretion of urine; is a diuretic the most certain in it's operation in the whole materia medica, operates quickly, brings on relief within a few days, and, under the stated circumstances, has often proved successful, where the squill, and the drastic purgatives had failed. The digitalis is to be recommended likewise when the exciting cause of the dropsy is a scrofulous complaint; in which malady also it is found to be of the greatest utility. But it is with the digitalis as with all other powerful remedies: though it affords a very efficacious mean of restoring health in the hands of a skilful practitioner, and administered in a cautious way, yet it operates like a poison, either when given in cases in which it should not be employed, when exhibited in too large a dose, or when it's use is too long protracted. When too long continued, the foxglove proves very injurious both to the irritable parts and the nerves, and has a strong tendency to weaken the sight, and the powers of the sanguiferous system. It almost invariably renders the pulse considerably slower, and even has sometimes destroyed the patient by abolishing the circulation. This has alarmed some physicians so very much, as to induce them to write against the use of the digitalis, and to hold it up as a very unsafe and pernicious remedy, which of course should be rejected. I can assert, however, from my own observation and that of other practitioners, that, by attending to the following rules in the exhibition of this remedy, the digitalis may be given, if not with success, at least without materially injuring the constitution of the patient.

First,

First, the dose ought not to exceed two grains twice a day: for when given in a larger quantity it often does a great deal of harm; and when this does not bring relief, I never saw any benefit from using a larger dose.

Secondly, the use of the digitalis is to be desisted from every ten or twelve days for a day or two, in order to give the sanguiferous system an opportunity of recovering it's strength a little.

Thirdly, to moderate the effects of the foxglove on the irritable parts and the nervous system, nervous remedies, as asafœtida, castor, valerian, and ammonia, are to be combined with it.

Fourthly, though the dose recommended will generally be born by the patients, yet they should be carefully watched, in order to observe what effects the digitalis has on the circulation; for if the pulse should sink very much under it's use, the dose is to be diminished. This caution I give, however, more to put practitioners on their guard, than from what I have observed myself. Though I do not question, that this remedy, given in the common way, may sometimes destroy the patient; having myself once been very near killing a woman, a patient of mine, with the foxglove; but I arrived time enough to prevent it's proving fatal, and the digitalis having emptied the patient, the return of the disease was happily prevented by bitters, cinchona, and chalybeates. Yet I never saw any alarming effect on the pulse take place from digitalis, given with the cautions I have attempted

to recommend; and I believe the foxglove is as safe a remedy as any, if these rules be duly observed.

The squill may also be taken with hopes of success, nearly under the same circumstances, under which the digitalis has been recommended; but it neither brings on such speedy relief, nor is so certain in it's operation: though on the other hand the squill may be protracted during a longer space of time; and may be used on many occasions, when the digitalis would be improper; because the squill can be accommodated to various circumstances, by combining different remedies with it, and by this combination the disorders, which otherwise frequently accompany it's use, are for the most part prevented. Thus in persons whose *primæ viæ* are irritable, opium is to be combined with this remedy; if the system appear to be very much weakened, the bark, and other tonics, may be usefully joined with the squill; or if it should stimulate the patient too much, it's stimulating power may in some measure be diminished by the addition of nitre. The dose should be adapted to the constitution of the patient, and the symptoms of the disease. I have generally seen it attended with the most success, when given so as to excite a slight degree of nausea. This medicine, however, is not advisable in patients of a tender delicate constitution, of an irritable habit, of a tense fibre, and a tight cordy pulse, on account of it's high stimulating power. The squill is likewise not to be employed, when the dropsy originates from the morbid state of the abdominal viscera, commonly called obstructions

tions of the liver; for it excites a chronic inflammation of the vessels by it's stimulating quality, and promotes it when already begun*. Lastly, this medicine should not be given in the inveterate dropfy, where the constitution is so much broken, that there are strong apprehensions of the patient's wanting strength to evacuate the serous fluid by urine, on being duly stimulated by the squill; for this remedy, taken under such circumstances, does not in the least promote the discharge of urine, but on the contrary increases the uneasiness of the patient.

If the dropfical patient be of an indolent habit, and of a flaccid fibre, and if with this insensibility there be still left a sufficient degree of strength, emetics and drastic purgatives should be administered, to evacuate the water. Strong antimonial emetics should be employed in this case, and repeated frequently at short intervals. But though vomiting has sometimes cured the disorder in very robust habits, where the patient's strength was not much impaired, and certainly claims a trial in the dropfy of the ovaries, which does not seem materially to interfere with the constitution; particularly as there are instances on record, that the disease in question has been removed by a spontaneous vomiting†, and there is some reason to hope, that by the shock the general system undergoes from the operation of a strong emetic, the fallopian tubes may be stimulated so as to take up the water, and convey it to

* Murray, l. l. t. v, p. 98 & 99: Ludwig, *Advers. med. pract.* t. ii, p. 697 & seq.: and Quarin, l. l. cap. viii, p. 171 & seq.

† Quarin, l. l. cap. viii, p. 152.

the womb, where, by means of the vagina, it would be expelled from the body; yet upon the whole emetics are very unsafe remedies in the dropfy, and far inferiour in efficacy to the drastic purgatives. They ought therefore but rarely to be used, and never without caution, as on many occasions the patient has expired during the operation of vomiting.

Of the hydragogues, elaterium, gamboge, and colocynth are the chief. The former two I have often seen given with the utmost success in cold, indolent, phlegmatic habits; and Dr. Buchaave has frequently removed inveterate dropfies, obstinate to all other remedies, with a decoction of the latter*. But as even small doses of the colocynth not unfrequently excite sixty stools or more during the course of the day, this remedy, though seemingly the most powerful in it's operation, is more suited to answer the purpose in the strong hardy constitutions of sailors, soldiers, farmers, and common people, than in weak and more irritable persons. For though it likewise powerfully evacuates the water in these, yet it's violent manner of operating weakens the general habit so very much, that the patient not unfrequently sinks under the malady, and his fate is hurried on by the sudden evacuation of the water. Beside these hydragogues, scammony, jalap, and mercurius dulcis, given in such doses as to have a drastic quality, have often been found successful: though in general, I believe, they are not quite so powerful as the elaterium, gamboge, and colocynth. The drastics should be always combined with some

* *Act. reg. societ. med: Hafn.* vol. iii, cap. xii, p. 156 & 169.

aromatic,

aromatic, which greatly increases their action, and at the same time prevents the gripings of the bowels, with which otherwise their operation is generally attended.

In speaking of diuretics I was silent respecting the *colchicum autumnale*, given in the form either of oxymel or of a decoction: for whatever has been said by some authors as to it's efficacy in dropsy, I must acknowledge with Quarin, that in all the cases in which I have seen it tried, it has invariably failed; and I am very much disposed to think, that where it did prove successful, the swallowing of a large quantity of water would have had the same effect.

In fine I must observe, that, though in general by using the above remedies, under the circumstances I have attempted to point out, the collection of serous fluid may be evacuated, yet they are incapable of performing a radical cure; for, unless they accidentally operate on the cause of the dropsy, neither the crystals of tartar, *digitalis*, squill, nor hydragogues, do any thing more than palliate the disease by the evacuation of the water: and though you may empty your patients by them, yet the water accumulates again and again, and a radical cure is not to be obtained, but by the removal of the cause of the disease. Nay sometimes the dropsy proves obstinate to all the diuretics and hydragogues, and the water is only to be evacuated by remedies operating on the morbid stimulus exciting the disease; a remarkable instance of which I remember to have read in a certain periodical journal, where the dropsy, bidding defiance to all

the usual remedies, was at last radically cured by the exhibition of the cicuta. In the inveterate dropsy, when the cause of the malady is not to be removed, and all that the practitioner can do is to render the condition of the patient as tolerable as the circumstances will admit, by occasionally emptying him by the means spoken of above, it will now and then be found, that the remedy, by which the water has been successfully evacuated on former occasions, afterwards fails, on account of the system having become accustomed to it's stimulus, and that, to expel the collected fluid from the body, a fresh stimulus is wanting.

If the above medicines do not expel the water from the body, it should be evacuated by surgical means. In anasarca cases, incisions in the extremities, or blisters applied to them, will often relieve. In the ascites and hydrops pectoris the collected fluid is to be drawn off by the paracentesis either of the abdomen or of the thorax. In the first case the operation should be performed a little below the navel, in the linea alba; not between the navel and the anterior spinous process of the ilium on the left side, as has been generally the custom till within a few years, in order to avoid the wounding of the epigastric artery. In the second the thorax should be pierced near the spine, between the second and third false ribs. The operation of the paracentesis, which has often been very successfully employed in an early period of the disease, is usually deferred too long; since the viscera undergo a morbid alteration in consequence of their long soaking in the serous fluid, collected in the cavity either of the
abdomen,

abdomen or of the thorax ; and a radical cure of the dropſy is to be deſpaired of in patients with a ſcirrhous liver, or diſeaſed lungs.

The water being evacuated, either by medicines or by chirurgical means, to prevent a relapſe, the tone of the general habit ſhould be reſtored by bitters, bark, alum, chalybeates, cold bathing, nourishing diet, country air, and moderate exerciſe. But it is not to be underſtood, that the tonics are never to be given previous to the evacuation of the water ; for in caſes where evident tokens of a debilitated ſtate of the ſyſtem appear, it will often be uſeful, to combine the cinchona and various bitters with the diuretics from the very commencement of the diſeaſe. When the dropſy happens after a copious hemorrhage, or long continued fever, and the malady thus chiefly originates from the relaxed ſtate of the general habit, thoſe remedies, by which the body may be reſtored to it's due tone, as bitters, chalybeates, the gum-refins, bark, and opium, prove not only efficacious in effecting a radical cure, but are likewiſe the beſt calculated for carrying off the water. In the inveterate dropſy, when the conſtitution is almoſt entirely broken by the diſeaſe, the adminiſtration of diuretics and draſtic purgatives would ſerve no other purpoſe but to hurry on the fate of the patient. In this unhappy ſtate, the remedies, from which benefit is to be derived, are bark and opium given in large doſes, camphor and nitre, and emulſions with aſa-foetida and camphor ; by the uſe of which I have ſometimes ſeen a conſiderable diſcharge of urine promoted, after diuretics and draſtic purgatives

had been tried in vain. Even in less urgent cases the practitioner will sometimes experience, that, during the use of diuretics or drastic purgatives, the patient becomes so much reduced in his strength, as to render it necessary to desist from them for a few days, and in the mean time to recruit the constitution a little by tonics, in order to enable the patient to bear their operation. In most cases, however, the tonics prove the most powerful, when the collected fluid has been previously evacuated,

When the dropsy terminates fatally, it often destroys by bringing on a hectic fever. A diarrhœa, arising towards the end of the disease, not unfrequently carries off the patient by destroying the remains of the vital powers. The dropsy of the thorax often kills unawares by suffocation; though sometimes the stagnant water becomes acrid, and excites a peripneumony, terminating in phthisis. In the dropsy originating from an increased action, death is usually brought on by an apoplectic fit, and the patient expires amid convulsions. Lastly, in an inveterate dropsy arising from debility, so many functions become injured, that it is absolutely impossible to determine accurately what occasions death; and it is more than probable, that the cause of death in such cases is very complex, and to be derived from the injured functions of different organs: sometimes, however, the patients fall into convulsions, in which they expire; at other times an apoplectic fit puts an end to life.

O R D E R III.

Debilities and Privations.

G E N U S I,

Scrofula.

THE scrofula is a swelling and chronical induration of the lymphatic glands, probably originating from a chronic inflammation, which they have undergone in consequence of a peculiar morbid condition of the absorbent system, and mostly attended with a peculiar countenance and state of the general habit.

The disease seldom appears before the sixth month, and does not very often begin after the tenth year of the child's age; though I have seen instances of children of only three months labouring under the disease, and others, where the disease did not make its appearance till the age of puberty. The scrofula attacks two very different sets of children, one of an irritable delicate complexion, the other of a cold phlegmatic disposition.

The chief appearances of the disease are a soft and flaccid habit, a smooth skin, rosy cheeks, a tumid upper lip with a chop in its middle, the columna nasi and lower part of the nostrils often likewise tumid, blue eyes, soreness and small ulcerations of the eye-lids and nostrils, the pupil for the most part dilated, the cheeks appearing turgid towards the ears, the jaws usually broad, the neck short,

and the abdomen hard and swelled; with which phenomena, when the malady more manifestly shows itself, enlargements of the lymphatic glands about the neck and under the jaws, and vague febrile movements are generally combined.

The causes, which bring on this disease ought to be divided into the predisposing, and the exciting. The former are,

1, An hereditary disposition; when children are born either of scrofulous parents, or of cachectical parents, weakened by the lues venerea, or any other disorder. In either case, the character of this disease is often impressed, as it were, on their tender bodies; and experience proves, that when these unfortunate children arrive at a certain period of life, they are very often afflicted with the scrofula*.

2, A bad diet and regimen of life. For if the infants, instead of the milk of the mother, destined for their nourishment by nature itself, be stuffed up with farinaceous paps; if the tone of their solids be relaxed by the frequent use of opiates; if crude glutinous food, such as bread mixed with a great deal of bran, and potatoes, be given to them, on which food alone poor children in some countries are often obliged to live, and which their tender stomachs are, in general, unable to digest; if the children live a sedentary life; if their *primæ viæ* become weakened by taking large draughts of warm water, or by any other means; it is not wonderful,

* Cullen, l. 1. § 1739: and Thuessink, in de voorrede voor de *Verhandeling over de Ziekte der Water-vaten van T. White*, p. 18 & 19.

that such children, though perfectly found at their birth, should contract the predisposition to the scrofula; and even that, when this unwholesome manner of living is persisted in, they should afterwards contract the scrofulous disorder itself,

It appears then, that children, though born of healthy parents, are nevertheless often afflicted with a predisposition to the scrofula from an improper way of living; and on the other hand, where infants are born with such a predisposition, the impressed scrofulous character is not unfrequently abolished by a proper diet, and manner of life, so that they remain free from this disease during their lives.

3, The climate and state of the air should not be omitted, in stating the predisposing causes of the scrofula; as these also contribute greatly to it's generation. Accordingly, scrofulous disorders are of most frequent occurrence in temperate climates; while they are but seldom observed in extremely hot or extremely cold regions; and they do not even afflict all temperate regions in the same degree; but the more the air of any country is damp and foggy, and the more it experiences sudden changes from hot to cold, and *vice versa*, the more liable are it's inhabitants to scrofulous complaint. Hence in England, Ireland, Holland, and the lower parts of Germany, no malady is of more frequent occurrence.

The predisposing causes are excited to act by morbid stimuli affecting the predisposed absorbent system

system in a specific way; and the occasional causes are the following.

1, The evolution itself of the body: for I have above proved, that no life can exist without a stimulus, and that the whole evolution is accomplished by means of stimuli; whence it is easy to be understood, why, at certain periods of life, when all the organs are, as it were, animated anew, this increased stimulus proves morbid, or an exciting cause to the weakened lymphatic system, by the concurrence of which with the morbid predisposition the scrofula itself is produced.

2, The time of the year. When the vital principle is excited by the season, the increased action of the solids also frequently furnishes an exciting cause of the scrofula: hence this complaint so often first appears in the spring, or in the commencement of the summer.

3, External violence, imperfect crises of acute diseases, metastasis of any exanthematous distemper, in a word, all morbid stimuli whatever, afford occasional causes; and therefore the scrofula frequently appears after the small pox, the measles, and the scarlet fever*.

As thus all the predisposing causes of this disorder produce a debility of the lymphatic system, and the exciting causes operate by preternaturally

* Hufeland, l. l. p. 49: & Leurs, *Pryfverhandelingen van het beelkundig Genoodfchap te Amsterdam*, t. ii, p. 18 et seq.

stimulating the lymphatics, the nature of the scrofula is hence manifest, and Hufeland has justly stated the proximate cause of this disease to consist in a debility, combined with too great irritability of the lymphatic system*.

This is farther demonstrated by the following considerations.

1, Infants and women, who, in general, surpass men in delicacy and irritability, are most liable to the scrofula.

2, The whole exterior of scrofulous patients is easily distinguishable from all others by it's laxity and apparent turgidity.

3, Tonics often alone effect a cure; and at least the scrofulous predisposition can never be removed, without having recourse to tonics†.

4, The symptomatical scrofula often appears after the application of stimuli, by which the irritability of the lymphatic system is increased; for the spurious scrofulous tumours are not unfrequently observed after the inoculation of the small-pox, after the communication of any poison, and even after inserting a seton, or making an issue.

* L. l. sect. 1, chap. 3, p. 58.

† See *Medical Obs. and Inq.* vol. i, chap. xii, p. 184, chap. xxv, p. 303, and vol. ii, chap. xx, p. 365; where the illustrious Fothergill demonstrates the great utility of the bark in this disease, and proves by many instances, that the bark alone is often sufficient for it's cure.

5, The symptoms of scrofula are almost all to be considered as the effects of some stimulus*.

6, Medicines, which enervate the morbid stimulus, and diminish the irritability of the absorbent vessels, such as mercury, and hemlock, often remove all the symptoms of the scrofula, though they do not destroy the predisposition to this disorder.

Thus the proximate cause of scrofula is to be looked for in the lymphatic vessels, that is in the solids; and the fluids are only to be considered as the cause of this disease, so far as they stimulate the vessels, and excite their reaction. In other words, the fluids may act as an occasional cause on the predisposed solids, when, on account either of the impaired tone of the digestive organs, or of improper food, the chyle deviates from the healthy state, and is vitiated both in quality, and consistency: because then the predisposed solids, preternaturally affected by the vitiated lymph, undergo a certain morbid alteration, and are thrown into irregular motions; the consequence of which is, that a specific matter, called scrofulous, is secreted, which is afterwards deposited by *metastasis* at various parts, and there excites different symptoms, according to the different functions of the affected organs. Besides, this matter is continually conveyed along with the chyle into the blood, infects the sanguiferous system, and thus at length a state is produced, which is com-

* Hufeland, l. l. p. 62.

monly known under the name of the scrofulous diathesis.

The following effects are produced in consequence of the scrofulous disposition of the lymphatic system.

1, The absorbent vessels spasmodically contract themselves at the slightest stimulus, and check the passage of the chyle, till this spasm is remedied either by nature or by art. Thus a stop is put to the passage of the chyle by spasmodic contractions of the absorbents, owing to the too great irritability of the lymphatic system; and by no means by a thick matter contained in their cavity. It is very improperly, therefore, that these constrictions are called by most physicians obstructions. My worthy preceptor, the celebrated Brugmans, has often injected mercury into such bodies through the tumid glands, with the same facility, as through those, which are commonly said to be free from all obstruction*. The illustrious Soemmering likewise observes, that though these enlargements of the glands are commonly called obstructions, yet it is by no means to be supposed, that, in reality, such glands are impervious, and obstructed; for that he generally found them pervious, at least to mercury†. If however the scrofulous complaint be not cured, the indurated glands become by degrees more and more altered in their structure, and, at last, their organical composition is entirely destroyed, and they

* Bernard, *Quest. varii Argumenti*, l. l. cap. iv, p. 28.

† L. l. § 37, p. 90.

resemble a sort of stony substance. This total destruction of their organical composition nevertheless but seldom happens; and when it does, still it takes place only in some glands; and, as far as I know, there exists no instance of a body, in which all the glands of the mesentery were found to have undergone such a complete degeneration.

2, The spasmodic contraction of the absorbent vessels both produces irregular motions of the lymphatics, and puts a stop to the absorption of the secreted fluids. Hence arise collections of a serous or watery fluid in different parts of the body, and preternatural dilatations of the lymphatics themselves. From the same source is to be explained, why lymphatic tumours, œdemas, and hydatides so often accompany this disease.

3, The scrofulous diathesis of the body is produced. For, as soon as the scrofulous character is once impressed on the conglobate glands, according to the rule of nature, that the effects are always in the compound ratio of the structure of the affected part, and the applied stimulus, as long as this character is retained, these glands continually generate a scrofulous fluid, and impregnate the chyle with it. This humour thus impregnated, enters the blood, and being conveyed by the sanguiferous vessels to all parts of the body, at length infects the whole system. For, as Dr. Kortum justly remarks, “ though the
 “ lymphatic system constitutes the primary seat of
 “ this distemper, and the scrofulous poison almost
 “ always makes the first attack on the conglobate
 “ glands, the scrofulous tumours are by no means
 “ con-

“ confined to these alone: on the contrary, if the
 “ disorder increase, and become inveterate, the
 “ conglomerate glands, and even the parts that are
 “ not glandulous, are likewise afflicted *.”

The scrofulous diathesis of the body is productive of the following effects.

1, It not only stimulates the conglobate glands, and very often incites in them a chronical inflammation; but operates, besides, on the nerves, the sanguiferous system, and the secreting vessels. Hence the convulsions, feverish motions, and vitiated secretions, so frequently observed in scrofulous patients; and if the scrofulous matter be deposited by metastasis on any organ, as frequently happens, ulcers of the worst kind, or caries of the bones, often arise in the affected part.

2, It produces in the lymph, and the other fluids, which pass through the lymphatic system, a tendency to spissitude; as is chiefly proved by the thick curdled matter, which is discharged from the tumours, occasioned by a metastasis of the scrofulous virus, when terminating in an ulcerating process.

It is not to be understood, however, that the matter discharged by a scrofulous ulcer has been deposited by metastasis at the affected place; but the fluid conveyed to the affected part by the irregular motions of the lymphatics excites a specific inflammation, in consequence of which a specific

* Soemmering, l. l. p. 86.

fluid is fecerned, which partakes of the scrofulous character.

Beside the effects here stated, Hufeland asserts, that the scrofulous diathesis takes away the nourishing quality of the lymph, by resolving this humour, and by destroying its nutritious particles; and this he assigns as the reason, why tabes always ensues from the scrofulous condition of the system when not cured. This author thinks, likewise, that in scrofula a certain acid is evolved from the vitiated lymph: which opinion he attempts to justify by the sour breath of the patients, their green or white stools, and an acid sweat, with which they are sometimes afflicted. Nay he goes so far as to say, that it is phosphoric: since the experiments of Dr. Gærtner show, that the urine of those, who labour under scrofula, contains less phosphoric acid than that of healthy persons; and that when the morbid matter is discharged from the body by a sort of crisis, phosphoric acid is always found in a great quantity in the urine of the convalescent*.

With the greatest deference to the abilities of this eminent practitioner, I must beg leave to make some remarks, on these supposed effects.

I doubt in the first place, whether the tabes might not be imputed with greater propriety to the alteration in the structure of the solids, occasioned by the continual operation of the morbid stimulus, than to a peculiar faculty of the scrofulous diathesis to de-

* L. l. cap. 5, p. 90, et seq.

stroy the nutritious parts of the lymph; which, by the by, seems to be a mere hypothesis, not in the least founded on the symptoms of the disease: for why should this resolution of the lymph be requisite; since the lymph itself, not properly assimilated by the degenerated glands, cannot afford a proper nourishment to the system? With respect to the evolution of the phosphoric acid from the lymph, I do not question the veracity of Dr. Gærtner; but I cannot comprehend, how Dr. Hufeland can possibly prove, from the symptoms of the disease, or from these experiments, that an evolution of the phosphoric acid, and an acid acrimony of the fluids, take place in this disease. For if it be true, that the secreted humours themselves do not preexist in the blood, but are generated by a specific power of the secreting organs, which Hufeland does not question, then certainly the phosphoric acid itself also does not preexist in the blood, but is formed in the kidneys themselves. What more then can be concluded from the experiments of Dr. Gærtner, than this, that the secretion of the urine is likewise vitiated in scrofula? At least the inference, that this acid, being retained in the blood, occasions the scrofulous acrimony, cannot be drawn from these experiments. The acid perspiration is by no means a constant symptom of the scrofula; for the most part it does not exist, and when the disease is attended with acid sweats, these are to be explained from the secreting organs of the perspirable matter being affected by the morbid stimulus. The sour breath of the patients, their acid eructations, heart-burn, and green or white stools, likewise are nothing but the effects of the debilitated state of the digestive organs, the

tone of which is always considerably weakened in this disease. Therefore, though in scrofula, in consequence of the previous altered state of the solids, the fluids undergo likewise a specific change, yet this alteration of the fluids is by no means to be compared with an acid acrimony, the existence of which Dr. Hufeland wishes to prove.

The prognosis of scrofula greatly differs, according to the constitution of the patients, according to it's complication with other diseases, and according to the different stages of the disorder. In general, the greatest hope of cure may be entertained, when the scrofula is not complicated with any other disease, and when the disease is not very inveterate: though even in these cases the cure is very slow and tedious; chiefly because the most powerful medicines generally do not afford the least benefit, if the patient, in spite of the precepts of his physician, neglect a proper regimen of diet. If a hectic fever have already been brought on by the long continuance of the disease, or the scrofula be complicated with other diseases, the prognosis is by no means so favourable. Still, however, the patient may be cured in the commencement of the hectic fever: but if it have already continued for a long time, and the solids, especially the mesenteric glands, have undergone a considerable alteration in their structure, the malady, for the most part, bids defiance to all remedies, and terminates fatally. If the scrofula be complicated with other disorders, it threatens more or less danger, according to the different complication.

cation. Upon this occasion I must state a cautionary remark.

When the scald head, or other scrofulous eruptions, appear on the surface, these should by no means be repelled by external applications alone; since frequently great mischief is occasioned by their retropulsion. I saw once, from a repelled scald head, an epilepsy brought on, which proved obstinate to all remedies; till at last, the true cause of the disease being discovered, the physician prescribed *æthiops antimonialis* along with a decoction of the woody-nightshade, during the use of which the scald head again appeared, and the epilepsy was removed.

With regard to the treatment of the scrofula, the radical cure of the disease is always difficult, and in general very slowly accomplished. Cullen goes so far as to say, "that we have not yet learned any practice, that is certainly or even generally successful in the scrofula*." From a great number of scrofulous cases I have had an opportunity of observing, I am however perfectly satisfied, that the scrofula, when it has not proceeded too far, in most cases yields in time to the power of physic, if it be properly treated, and a suitable regimen be adopted in conjunction with the medical treatment. The general indications for the cure of the scrofula are the following.

1, The remote causes of the disorder, when still existing, should be removed. For if these be

* L. l. vol. iv, § 1753.

suffered to remain, the scrofula bids defiance to all remedies.

2, The morbid irritability of the absorbent system is to be diminished; the disposition of the lymphatic glands to secrete a scrofulous fluid should be removed; and the solids disposed in such a manner, that the morbid matter be conveyed by the *natura medicatrix* to various excretories, and thus discharged from the body. This indication is answered by remedies, which either operate with a specific stimulus on the absorbent system, or, destroy the scrofulous action by exciting other motions in the general habit, or which put a stop to the irregular motions of the lymphatics by their antispasmodic quality; or which check the too great irritability of the absorbents, and enable the *natura medicatrix* to get rid of the morbid stimulus by restoring the habit in general, and the *primæ viæ* and the lymphatics in particular, to their due tone. Hence strengthening remedies are frequently the best calculated for removing the irregular motions of the absorbent system, because it's morbid irritability often originates from weakness. For the rest, mercurials, antimonials, cicuta, murias barytæ, murias calcis, burnt sponge, opium, asafœtida, the resolvents*, belladonna, dulcamara, guaiacum, absorbents,

* I here make use of the word resolvents, because, though incongruous, it has hitherto been commonly employed as a technical term; and, by no means, because these medicines really operate by a resolving quality: for I have above proved, that no obstruction exists, what therefore can they resolve? It is, besides, highly probable, that these medicines act in a quite different

forbents, and the expressed juice or a strong decoction of colts-foot, answer best these purposes.

3, During the whole course of the disease emetics and purgatives should occasionally be employed to keep the *primæ viæ* clear, which are always disposed to collect fordes in this disease.

4, The general habit and the lymphatic system should be strengthened by cinchona, the bark of the white willow, gentian, preparations of steel, bitters, myrrh, nourishing diet, country and sea air, moderate exercise, the cold bath, and sea bathing. The due observance of this indication is of the greatest moment in the treatment of the scrofula: for, this being neglected, a radical cure cannot be obtained; and though sometimes all the symptoms of the disease may be removed by other remedies, yet, if tonics be not given, the predisposition of the convalescent to the disorder remains, and in most cases the scrofula, sooner or later, makes it's appearance afresh.

The compass I propose to this work does not permit me separately to inquire into the nature of the remedies recommended, and in what cases each of them should be employed. I am the more

ferent way, from what is commonly believed. Calomel, for instance, is called by every one a very powerful resolvent; but does this medicine operate in the inflammations of the liver, in tetanus, in hydrophobia and in other spasmodic diseases, by it's resolvent quality? By no means. On the contrary, I am strongly disposed to believe with Richter, l. l. page 276, that it operates by an alterant, antispasmodic, and sedative virtue.

justified in dispensing with this inquiry, as Hufeland has fully treated on this subject in his late excellent work on scrofula: so that I shall content myself with mentioning what remedies I have seen attended with the most success in scrofulous cases, and with laying down some general rules, to which careful attention must be paid by the practitioner, if he would be successful in treating this disease. The remedies from which I have either myself experienced benefit, or which I have seen employed with advantage by others, are mercurius dulcis, crude antimony, sulphur auratum antimonii tert. præcipit. flores sulphuris, rob sambuci, cicuta, opium, asafoetida, dulcamara, digitalis, the expressed juice or decoction of colts-foot, the terra foliata tartari, spiritus Mindereri, rhubarb, tartarus tartarificatus, extractum graminis, taraxaci, soda, ammonia, jalap, aloes, gum galbanum, myrrh, bark, gentian, sarsaparilla, preparations of steel, and mineral waters. The belladonna I never saw tried in scrofula. The burnt sponge I have seen given in several cases with success; but it is to be used with caution in persons of a tense fibre and delicate constitution, especially in those, who are disposed to consumption; as, on account of its stimulating quality, it frequently gives rise to hæmoptysis, and chronic inflammation of the lungs. The murias calcis also I have never seen used; but from lime-water I have in some cases experienced a great deal of benefit. The terra ponderosa salita is very much recommended by Hufeland; but in the few cases in which I saw it given, it invariably failed. Guaiacum I never saw tried in this disease. It needs scarcely to be observed,

that

that these different remedies are not indiscriminately to be used, but should be adapted to the constitution of the patient and the stage of the disease.

With regard to external applications, the dissection of scrofulous tumours on their first appearance may sometimes be accomplished by the volatile and saponaceous liniments, mixed occasionally with camphor and Barbadoes tar, and by mercurial ointments. As the scrofulous ulcers depend upon the general morbid diathesis of the system, it would be in vain to attempt their cure by topical remedies; and their healing up would be unsafe, as in this case the disease is often translated to some internal organ. The applying of simple saturnine dressings, therefore, is in general all that should be done: but when the complaint attacks any of the large joints, the ulcers become swelled and painful, and the discharge thin and acrid, the savine ointment I have in several cases seen applied with advantage. In cases of scald head, and other cutaneous eruptions of the scrofulous kind, the affected parts are to be well washed four or five times a day with a lotion, consisting of a few grains each of verdigrise and hydrargyrus muriatus dissolved in water; or what is still better, cloths dipped in it should be applied to the parts. The proportion of verdigrise and sublimate is from a quarter of a grain to a grain of each to an ounce of water, more or less, according to the age and strength of the patient. With this lotion I have cured about forty children with scald heads; and I never found it fail, except in two farmers sons, one sixteen, the
other

other twenty years of age, in whom the disorder was of many years standing; and in these I had afterwards recourse to the unguentum citrinum, but in vain. In all species of herpes, and in all cutaneous eruptions of the scrofulous kind, I have seen used with advantage either the above lotion, or the hydrargyrus muriatus dissolved in Goulard's water, with the addition of tincture of opium, in cases where the eruption was painful; the unguentum hydrargyri nitrati mitius of the New London Pharmacopœia, either alone or mixed with an equal quantity of unguentum nutritum I have likewise found very useful; especially in cases which partook more or less of the nature of the itch. But none of these external applications should ever be used, without giving medicines at the same time inwardly, in order to prevent a translocation of the disease to some internal organ. The speediness of the cure depends upon the more or less inveterate stage of the disease, and a due attention to cleanliness.

In treating the scrofula the following general rules should be observed.

1, As in the scrofula the *primæ viæ* are always apt to be filled up with sordes, on account of the digestive organs not properly performing their function, it may be safely laid down as a general principle, to begin the cure of the disease by cleansing the alimentary canal effectually, by a vomit, and a purgative of rhubarb and calomel, which will be found to assist very much in the removal of the disease. *

2, That

2, That there exists no specific against the scrofula, but that very different medicines should be used according to the different stage of the disease, it's different complications, and the different constitutions of the patients. To all these circumstances the strictest attention should be paid, for the same remedy, which effects a radical cure in one case, often does a great deal of harm in another.

3, As the scrofula is a malady, the cure of which is always very slowly performed, the remedies should from time to time be changed; because the system frequently becomes habituated to the stimulus of a remedy when used for some time, and requires another to be properly stimulated. It is not to be understood, however, that the practitioner, after having given a remedy for a few days without any perceptible benefit, should directly have recourse to another; for patience and constancy are to be strongly recommended both to the patient and the physician, the disorder very often showing no sensible alteration during the first few weeks of the treatment. But what I wish to express is this, that, when any remedy, after having operated evidently on the system, seems to lose it's efficacy, and the disorder, as it were, stands still, another should be administered in it's stead, in order to rouse the body out of it's dormant state.

4, The practitioner should carefully distinguish between the remedying of the local symptoms of the scrofula and it's radical cure; and by no means leave off the use of medicines at the disappearance of the local symptoms: for though these are entirely
remov-

removed, still the predisposition to the scrofula may remain; and unless this also has been removed by strengthening the body by the use of tonics and a nourishing diet, as soon as the predisposition is called into action by any morbid stimulus, the scrofula appears afresh.

5, As a certain degree of debility is always combined with scrofula, and even the morbid irritability of the lymphatic system not unfrequently originates from this source, it will often be found useful, from the very commencement of the disease, to combine tonics with the resolvents, as they are commonly called, and thus to satisfy the second and fourth indications at once.

6, A proper diet and way of life are of the greatest moment in the scrofula; indeed all medicines are of no use without them, and it would be more easy to cure a scrofulous patient merely by a suitable diet and manner of living, without any medicine at all, than to perform the cure by the most powerful articles of the materia medica, without paying due attention to the regimen. To the re-establishment of health a simple diet, chiefly animal, of easy digestion, moderate exercise, mineral waters, country and sea air, cleanliness, cold and sea-bathing, will be very conducive. When the patients are extremely weak, however, they usually do not bear the cold bath, before their strength is a little recruited. In these cases the tepid bath should be used in it's stead.

By observing these rules, and by the use of the remedies we have attempted to recommend, the scrofula will generally be found to yield by degrees to the power of physic. Sometimes, however, the disease baffles the most skilful treatment, and, after it has continued for several years, it is spontaneously cured by the changes the constitution undergoes at the period of puberty. In these cases all that art can do, is to watch the disease, to palliate it's symptoms, and to check as much as possible it's progress.

If all the endeavours of physic prove fruitless, which is frequently the case, when the physician has not been called in till the inveterate stage of the disorder, the state of the patient grows worse and worse, and the disease sooner or later terminates fatally. Such patients are destroyed in three ways.

1, By the dropsy: which is occasioned either because the absorption of the secreted matter is checked for a long time by the spasmodic constriction of the lymphatics, or because a serous fluid is deposited in some cavity of the body by their irregular motions.

2, By the *tabes mesenterica*: in which case the glands become daily more and more indurated, and their organic composition is gradually destroyed; a hectic fever is brought on; and by this the patients are carried off.

3, A translocation of the disease happens to the lungs, terminating in a fatal consumption.

G E N U S II.

The Rickets.

THE disease called the rickets is a morbid state, taking place peculiarly in children, by which the bones, having lost their firmness, become incurvated.

The disorder seldom appears before the eighth or ninth month, and rarely begins after the third year of the child's age. The rachitic commonly have a very good understanding, and a premature sensibility; sometimes however the faculties of the mind are impaired, and stupidity or fatuity prevails. The symptoms of the disease are, a lax habit; a flaccidity of the flesh, the body at the same time becoming leaner, and the abdomen hard and tumid; a pale countenance with occasional flushings of the cheeks; a head preternaturally large with respect to the body, in particular the forehead being unusually prominent; the fontanella more open than usual in children of the same age; the process of dentition very slowly performed, and much later than usual; the teeth in many cases turn black, and decay; the ribs lose their convexity, and become flattened on the sides; the sternum is pushed outward; the epiphyses at the several joints of the limbs grow large, while the limbs between the joints are more slender and flaccid; the bones increase in size, but seem to be every where flexible, and become variously distorted, especially

rickets; and this disorder frequently succeeds them very quickly *.

As the same causes, when applied under the same circumstances, always produce the same effects, and the remote causes of the rickets are the same as those of the scrofula, it follows of course, that the nature of both diseases must be similar, though not entirely the same, because, as they are not communicated under the same circumstances, each affords different symptoms. Thus the nature of the rickets also consists in the debility of the lymphatic system, combined with it's increased irritability. The disorder differs from the scrofula, however, in degree; so that the debility of the lymphatic vessels seems to be greater, and their irritability less, in proportion to the age, than in the scrofula. Indeed, that the nature of the rickets is similar to that of the scrofula, the following arguments prove beyond all doubt.

1, Children, whose bodies are very delicate and irritable, are usually the only sufferers by this disease. Now “ the lymphatic system is by far the
 “ weakest of all the parts of the infantile body, and
 “ at the same time the most irritable: on the other
 “ hand, the functions of this system are of much
 “ greater moment in children, than in adults; for
 “ the former much more need nutritious particles

* Buchan, l. l. p. 651: Rosenius a Rosenstein *de Morbis Infantum*, cap. xxiv, p. 142: Stoll, *Prelect. in divers. Morb. chron.* cap. ii, p. 22: and Veirac *Verhandeling over de Engelsche Ziekte*, p. 57, 141, et 147.

“ than the latter, who only want the reparation of
 “ their losses*.” It is of course not to be wondered at, that the young should be often afflicted with disorders of the absorbent system.

2, The general laxity and debility of the system in the rickety afford another proof of the truth of this opinion.

3, The efficacy of such remedies, as strengthen the habit in general, and the chylopoietic organs in particular, in the cure of this malady, is another unequivocal test. Tonics alone for the most part perform the cure; and though without their use the symptoms of the disease may indeed sometimes be removed, yet the disorder itself can by no means be radically cured.

4, That the irritability of the lymphatic system is also preternaturally increased in the rickets, not only appears from the symptoms of the disease, most of which are to be considered as effects of some stimulus; but also from the efficacy of such medicines, as deaden the noxious stimulus, in palliating the disorder: such as soda, and the absorbent earths, which almost always effectually remove the symptoms of this disease.

5, Cullen has observed, that children born of scrofulous parents are afflicted with the rickets more than others†. Dr. Kortum remarks, that

* Soemmering, l. l. § xxxvii, p. 93.

† L. l. vol. iv, § 1722, p. 354.

the one disease frequently terminates in the other*: and I have often seen the scrofula in children, who before had laboured severely under the rickets: an evident token, that the greatest affinity exists between the two.

6, It is proved by the dissections of those who have died rachitic, that the seat of the complaint is in the lymphatic system, for in such bodies the liver is always increased, and the spleen and the other viscera are, for the most part, both in size and weight. The lymphatic vessels appear of a greater diameter than usual; the glands of the mesentery are always enlarged, sometimes they are found indurated; nay some of them not unfrequently appear to have undergone a total destruction of their organic composition†; which evidently shows, that the primary seat of this disorder is to be looked for in the absorbent system, and especially in the lymphatic glands;‡

Thus it is evident, that the proximate cause of the rickets is by no means, as the framers of the humoral pathology have not hesitated to assert, an acid acrimony, which, being absorbed by the lymphatic vessels, and carried into the blood, produces such a morbid state of the vital fluid, especially of its serous part, that the rickets are always generated in consequence: but, on the contrary, this disease is produced, as often as the predis-

* Soemmering, l. l. p. 96.

† Van Swieten, l. l. T. v, § 1485, p. 595: Oosterdyk, l. l. cap. lxxxix, § 3, p. 290: Veirac, l. l. § 80: and Ackermann, *Commentatio medica de Rhachitide*.

posed absorbent system is excited by noxious stimuli, so that the lymphatic glands, having undergone a specific alteration, secrete a specific morbid fluid partaking of the rachitic character. Beside what I have already said on the subject, the following remarks evidently prove, that the opinion of an acid acrimony is inconsistent with the observations of nature.

1, Some infants are attacked with the rickets, according to the testimony of Dr. Veirac himself, one of the chief advocates for an acidity of the fluids, without the least mark of an acid in the *primæ viæ* having ever appeared in them*: and experience proves, that many children, who labour severely under acidity in the *primæ viæ*, are never afflicted with this malady. It has been generally supposed, that a disorder of the *primæ viæ* was always observed in the rickets previous to the affection of the mesenteric glands. This, however, is a mistake, for the rickets sometimes occur without any previous affection of the *primæ viæ*, and of course the derangement of the stomach cannot constitute the proximate cause of the disease.

2, The first symptoms of the disease show only a debility, and laxity of the solids; and the alteration of the fluids is not to be observed, till the malady has grown inveterate, or existed for a considerable time.

* Rosenstein, l. l. p. 155 & 156: Buchan, l. l. p. 653 & 654: & Callen, l. l. vol. iv, p. 350.

3, Tonics, and even the cold bath, often perfectly cure the rachitic: on the contrary, the antacids have often not the least effect without tonics, or at the utmost they remove only the symptoms of the disease.

4, Lastly, even taking it for granted, that acidity of the *primæ viæ* is a constant attendant of the rickets, yet the symptoms of the disease cannot possibly be accounted for from this source. For the acid generated in the *primæ viæ* would by no means be taken up by the extremely irritable orifices of the absorbents; and supposing it's milder and more dilute part to be at length absorbed with the chyle, it would have undergone such a change in it's passage through the lymphatic system, that, when it entered the mass of blood, it would not be capable of softening the bones; not to mention, what effects an acid able to soften the bones would exercise on the absorbent system and the blood-vessels. May it not likewise with propriety be asked, why the acidity of the *primæ viæ* should possess the power of producing the rickets in children alone, and not in adults? the more as in the osteosarcofis, and in the highest degree of scurvy, the bones of adults become softened; and the acid generated in their *primæ viæ* is on certain occasions so sharp, as to irritate the skin of the throat, and set the teeth on edge, without producing the least effects on the bones.

The rachitic disposition of the absorbent system produces the following effects:

1, The

1, The spasmodic contraction of the lymphatic vessels, and their irregular motions, impede the absorption of the secreted fluids, and not unfrequently produce œdemas of the hand and feet, and even sometimes a general dropfy; which symptoms, in the commencement of the disease, soon disappear by giving emetics, by which the spasm of the lymphatics is removed; their cause however remaining, the symptoms quickly return, and at last persist, so that the patients are often destroyed by the dropfy.

2, The rachitic diathesis itself is generated. For, as a fluid partaking of the rachitic character is continually fecerning by the degenerated lymphatic glands, it mixes with the chyle, and is thus carried to the blood, which it likewise infects, and thus the rachitic diathesis is produced.

The consequences of this are the following:

1, It acts on the nerves, and impresses on them a very strong propensity to spasm. Hence convulsions are so frequently met with in the rickets*: and even sometimes this spasmodic disposition can never afterwards be abolished, but this morbid irritability afflicts the persons, who before were attacked with the rickets, during their whole lives. It exercises no less power on the sanguiferous system. The blood becomes thin, and improperly assimilated; the circulation is irregularly performed; and the vital fluid is carried in greater quantity to

* Veirac, l. l. p. 209.

the internal organs, and less to the external parts*. This explains why in such bodies the viscera are always found increased both in size and weight, and the exterior parts on the contrary emaciated. The vitiated blood stimulating the secreting organs in another manner, than in the healthy state, the secretions become likewise depraved.

2, It produces in the lymph, and in the other fluids, which pass through the lymphatic system, a propensity to spissitude; as is evident from the secretion of a thick curdled matter, which sometimes appears at the joints, and is the effect of a specific inflammation, which the affected parts have undergone in consequence of a translocation of the disease to them†.

3, It gives to the sanguiferous vessels a greater capacity for caloric: that is, it affects them in a peculiar way, so that they attract a greater quantity of oxygen gas, and of the latent heat combined with it: for the singular phenomenon, that the bodies of the rachitic retain heat longer, and do not easily grow rigid after death‡, seems to be owing to this faculty.

Beside these effects, several physicians are of opinion, that an acid is evolved in this malady. They disagree, however, as to it's nature: for some

* Veirac, l. l. §. 49, p. 58: and Cullen, l. l. vol. iv, p. 363.

† Veirac, l. l. p. 86, 90, & 129.

‡ Stoll, *Prælect. in Morb. chron.* vol. i, p. 21: Rosenstein, l. l. p. 144: & Callisen, l. l. t. ii, p. 650.

of them assert, that it is a vegetable acid; and others, on the contrary, that it is the phosphoric: which sufficiently shows on what poor grounds their opinion is founded. The arguments they use, to prove the existence of this acid, are exactly the same as were refuted when on the subject of the scrofula. Thus there is no need to repeat them: and the less, as the whole history of the disease evidently proves, that the peculiar state of the fluids in the rickets is neither acid nor alkaline.

The reason, why this distemper attacks infants alone, seems to be, because the lymphatic system in adult persons very seldom experiences so great a debility and irritability as are requisite to the disease: yet there are a few instances on record of adult persons having suffered a softness of their bones from a disease analogous to the rickets. This distemper in adults is called *osteosarcosis*; the nature of which, as it is of rare occurrence, and such bodies have still more seldom been accurately examined, is hitherto not well ascertained: but the analogy between the symptoms of the *osteosarcosis*, and those which accompany the rickets, seems to prove, that it's seat also is to be looked for in the lymphatic system; and the more, as it is proved beyond all doubt by the dissections of such bodies, that the lymphatic glands, both of the mesentery and the viscera, were enlarged and indurated in different persons carried off by this disorder*.

* L. L. Plank, *Commentatio de Osteosarcosi*, Tubingen, 1782, p. 13 & 54.

The softness of the bones in the rachitis has been explained by the ingenious Mr. Ashley Cooper, lecturer on surgery at St. Thomas's Hospital, from this, that as all the constituent parts of the blood are to be found in the lymphatic system, and the coagulable lymph is especially formed by the lymphatic glands, the natural inference must be, that these, on account of being in a diseased state, are incapable of performing their function, and consequently the system is not properly nourished. This explanation, though it sufficiently accounts for the debility of the system observed in this disease, yet seems in my opinion incapable of clearing the matter from all doubt: for the question still remains, why the bones become preternaturally softened in the rachitis; while, on the contrary, in the scrofula, though the glands are likewise diseased, the softness of the bones does not ever occur.

Besides, if we examine the bones of the rachitic, we shall find, that the change they have undergone is not owing to the want of earthy particles alone. For there exists a great difference between the rachitic bones, and those which are softened by being macerated in acids: as these become soft and flexible, on account of their earthy particles being taken up, without any other change; whereas the rachitic bones are not only soft, and yield even to a moderate pressure, but likewise, on account of the abundance of animal matter, increase in size, and exhibit as it were a spongy mass. I am therefore rather inclined to believe, that it is no want of nutritious matter which occasions the softness of the bones; but that the secreting vessels, on account of their being specifically altered, secrete, instead of the usual bony substance, a peculiar

a peculiar matter, incapable of being changed into bony substance. But as the osseous particles are continually withdrawn by the lymphatics, and the fecerning vessels, instead of supplying the bones with osseous particles, afford scarcely any thing but animal matter, the consequence must be a preternatural softness of the bones.

In fine, though it is very difficult to explain how it happens, that some rickety persons possess a great deal of wit, and others, on the contrary, are found to be very stupid, I am of opinion, that this phenomenon depends upon the different action of the rachitis on the head, and upon the consequent form the bones of the skull assume. In reality, the shape of the skull is of the greatest moment for the evolution of the faculties of the mind; so that, *ceteris paribus*, the sensibility or stupidity of the mind, for the most part, may be judged of by it. At least the learned Dr. Veirac, who has had an opportunity of treating many rickety children, always observed, that children who acquired from the disease a large capacious forehead, with prominent eyebrows, and whose eyes therefore seemed to sink in, were endowed with a fine genius: whereas other children, in whom the rickets occasioned a flat and somewhat crooked forehead, eyes more or less protuberant, a rising crown of the head, and the hinder part of the head prominent, became stupid*.

The rickets may be easily and speedily cured in the commencement: but when inveterate, it is re-

* L. l. §. 18, p. 97 & seq. & §. 70, p. 112.

quisite in the prognosis to attend to the state of the lungs, and the abdomen; the febrile commotions; and the tumefaction of the body. For if a pulmonary consumption have been produced in consequence of a translation of the disease to the lungs; if dropsy have been brought on by the continuance of the disorder; or if the abdomen be very much swelled and hard; especially if this tumour of the abdomen be attended with a hectic fever; the patients are always in the utmost danger, and the disease has usually a fatal termination. Whereas, if these symptoms be wanting, though the malady be of long standing, they are generally restored to perfect health.

After removing the remote causes, and cleansing the *primæ viæ*, the cure of the rickets is to be obtained by answering the three following indications.

1, The rachitic character, and the too great irritability of the lymphatic vessels, are to be removed; and such a disposition of the solids is to be induced, that the morbid matter may be expelled from the body through the different emunctories by the *natura medicatrix*. This indication is accomplished by soda, magnesia, and the other absorbent earths, asafœtida, woody-nightshade, and tonics.

2, During the whole course of the disease, the *primæ viæ* should be kept clean by the occasional exhibition of emetics and purgatives.

3, The system in general, and the chylopoietic organs in particular, are to be strengthened by bark, bitters, the preparations of steel, the decoction of
madder,

madder, cold bathing, a nourishing diet, bodily exercise, and country air.

As the rickets in a great measure originate from the general laxity and debility of the system, especially from the relaxed tone of the digestive organs, on the weakness of which the morbid irritability of the lymphatics chiefly depends: it is evident, that, in the inveterate state of the disease, emetics, purgatives, soda, and absorbent earths, are of little use, without tonics; and at most do nothing but palliate the symptoms. Hence tonics should always be given along with the soda and absorbents, in order to enable the *natura mediatric* to expel the morbid matter. Indeed in this disease, to strengthen the habit, is generally all that is requisite; and the solids being restored to their due tone, nature usually gets rid of the morbid matter by their efforts.

If the inveterate rickets cannot be cured either by nature, or by art, the patients are destroyed either by an apoplectic fit amid convulsions; by the dropsy; by the pulmonary consumption; or by the mesenteric tabes.

I have already treated above of the manner in which these diseases destroy life.

G E N U S III.

Scurvy.

THE scurvy is known by a change of colour in the face from the natural and usual look to a pale and bloated countenance; a listlessness to exercise; a stiffness and feebleness of the knees; a softness and bleeding of the gums; a dry rough skin, marked with spots of different colours; œdematous legs, and a hardness of the muscles, particularly a degree of rigidity of the hamstrings. In the more advanced stages of the disease, the breath becomes fetid and offensive; the urine is high coloured, fetid, and small in quantity; ulcers break out, especially in the gums and legs; these ulcers are covered with a soft spongy substance, which if removed is quickly produced anew; yellow, purple, and livid spots appear on the skin; tumours arise in various parts of the arms and legs; shifting pains occur all over the body, but especially in the shin-bones; severe pains in the side ensue, with difficult and oppressive respiration, frequent faintings, and catching of the breath even on slight motion or exposure to a colder air than is commonly breathed by the patient. Nay it is by no means uncommon for scorbutic sailors to walk upon deck and to drop down dead; or to expire when moved from the ship in order to be put on shore. The patients are in general costive; though sometimes they labour under a diarrhœa with griping and bloody stools: the teeth frequently drop out, and sometimes

sometimes a salivation comes on; hemorrhages are frequent from different parts of the body, especially from the nose, and from ulcers: every slight division of the skin degenerates into a foul sore, and old cicatrices often break out afresh: the epiphyses, apophyses, and even the cartilages separate from the bones; and the bones themselves sometimes grow brittle and softened, so that spontaneous fractures have occasionally happened, a remarkable instance of which the learned Dr. Bonn describes and delineates*. Dr. Lind mentions cases, wherein even the callus, which had been completely formed a long time before, became again soft, and the fracture seemed as if it had never been consolidated†. These phenomena, in the same manner as in the rickets, seem to be explicable partly from the greater absorption of the bony substance, and partly from the secretion of a peculiar matter not to be changed into firm bone.

The predisposing causes of the scurvy are whatever debilitates the body in general, and the lymphatic system in particular. The chief are preceding diseases, fatigue, cold, moisture, indolence, want of cleanliness and exercise, and the sedative passions.

The occasional or exciting causes of scurvy are a diet of salted or smoke dried provision, or the want of fresh victuals, especially of the vegetable kind. But it is to be observed, that the living

* *Tab. Off. morbos.* tab. xx, fig. 2.

† Lind *on the Scurvy*, p. 253.

upon salt provision does not generally produce the disease in persons, in which the requisite predisposition is wanting. Dr. Lind assures us, that “ he
 “ had known messes as they are called of seamen,
 “ who have lived during a voyage of three years
 “ on the ship’s provision for want of money to purchase a better fare, especially greens, and yet
 “ have preserved their health.” The same author, who has been frequently in the way of seeing this disease in all it’s different forms, perhaps more than any other physician living, observes, “ that
 “ this disorder is for a long time confined to the
 “ common seamen; and though the officers servants
 “ are at such times often afflicted with it, while
 “ using the same dishes with their masters; yet it
 “ is but rare to see the disease in even a petty
 “ officer*,” “ that the warrant officers, though
 “ often obliged to live upon the ship’s provisions,
 “ yet by lying in warm dry cabbins, and going
 “ better clothed, are seldom attacked with the
 “ scurvy, unless during it’s most violent rage, and
 “ when the common sailors have been previously
 “ almost destroyed by it †.” Of the great influence the predisposing causes have in producing the scurvy; the seamen under the command of Lord Anson, in the year 1746, afforded a striking instance. Lord Anson cruised four months, waiting for the Acapulco ship in the Pacific Ocean, during which time the men continued in perfect health; but after leaving the coast of Mexico, the weather becoming cold and rainy, in less than seven weeks at sea the scurvy became highly destructive, not-

* L. l. p. 43.

† L. l. p. 69.

withstanding he had plenty of fresh provision and good water on board *.

Another not less remarkable instance of this we have lately seen in the dreadful scurvy, which broke out in the year 1786, among the Russian sailors, then living on shore at Cronstadt. These people were kept remarkably nasty, they were badly clothed, and their lodgings were very dirty, damp, and imperfectly aired. It is true indeed, that their diet was a very improper one, and extremely tending to produce the scurvy; but as the Russian seamen are in general capable of living upon such a diet, without being particularly afflicted with the scurvy, the raging of the disease is no doubt to be explained from the want of cleanliness, cold, improper air, and humidity of the atmosphere in which they were obliged continually to live.

But though in general the predisposing and exciting causes concur in the production of the scurvy, yet their concurrence is by no means necessary to produce the disorder: for the predisposing causes may operate as an exciting cause in persons already weakened either by these very causes, or by others; and thus bring on the scurvy without the concurrence of the exciting causes: whereas the predisposition, and afterwards the disease itself, may be communicated to healthy persons by the exciting causes alone; when their action has been protracted for a considerable time. Hence it is easy to be explained, why the living upon salt provision is by no means requisite to produce the scurvy; the scurvy being frequently met with on

* Lind, l. l. p. 52, 53, 55, 62, and 69.

shore, especially in persons exposed to cold and moisture: why sometimes the scurvy rages, where fresh vegetables are not wanting*: why it may make it's appearance even among the inhabitants of a dry and pleasant country†: and why, in fine, the strongest and most hardy seamen very often labour under the scurvy in a high degree.

The manner in which improper food, or the want of fresh victuals, which is doubtless the most powerful exciting cause of the scurvy, brings on the disease in the predisposed, seems to be this. Salted or smoke dried provision is a food difficult to be digested, when used for any considerable length of time, unless in persons of a remarkably strong constitution. The stomach and intestines do not suffer by such diet; on the contrary it seems rather to improve the appetite; but the lymphatic system, the function of which is to prepare the constituent parts of the blood, cannot but with difficulty convert such food into pure lymph. Hence, when it is weakened by any cause, the lymphatic system is no longer capable of counteracting effectually the stimulus occasioned by such a diet; but, being specifically stimulated by this, the absorbent vessels, especially the lymphatic glands, undergo a specific alteration; the consequence of which is the secretion of a matter of a peculiar kind, which contaminating the chyle, and being conveyed with it into the blood, infects the whole constitution, and produces the scorbutic diathesis of the system. It is not therefore the deficiency of nourishment, that causes the disease

* Lind, l. l. p. 61.

† Macbride, l. l. vol. ii, p. 382.

in question; for though it be allowed, that salt meat undergoes great alterations, and is by no means so nutritious as fresh beef, yet such a diet is still nourishing enough to allow all the functions of the body to go on: but the scurvy is produced by the morbid stimulus communicated to the lymphatic system by the salt provision. Hence, the scurvy may be brought on, not only by such a diet, but also by other causes stimulating the absorbent system in a specific manner.

As thus all the predisposing causes of the scurvy operate by weakening the body in general, and the lymphatic system in particular; and it's exciting causes act by specifically stimulating the lymphatic system; the proximate cause of this disease seems to consist in a debility of the absorbent system joined with it's preternaturally increased irritability. Hence may be explained why the scurvy, as to some symptoms, bears a degree of affinity to the scrofula and rickets; though the degree of the debility and irritability of the absorbent system is very different in the scurvy to that observed in both these disorders, and therefore the remedies highly useful in those are of no efficacy at all, or even prove hurtful, in this.

Now that the debility of the lymphatic system, joined with it's preternaturally increased irritability, is the real source of the scurvy, the following arguments prove beyond all doubt.

1, The torpor of the vital principle, which always accompanies the scurvy, is by no means owing to a real debility of the whole body, but to it's languor alone, brought on by the morbid state

of the lymphatic system; as is demonstrated by the cure of the disease: for in all stages of the scurvy, even in the highest degree of the disorder, the use of fresh vegetables, especially of acid fruits, performs the whole cure, and the scorbutic patients are soon restored from the extreme of sickness to perfect health by the use of them, without the aid of any other medicine. Thus it is evident, that the scurvy does not depend on a debility of the whole body, but is produced by a morbid state of the lymphatic system.

2, That the debility observed in the scurvy originates from a morbid state of the absorbent system, and by no means from the debility of the general habit, is likewise proved by the inefficacy of those medicines, which invigorate the system in cases of real debility. Wine, a very powerful cordial, gives but a momentary stimulus, and checks not in the least the progress of the disease. The Peruvian bark, snake-root, contrayerva, the different preparations of steel, and other tonics, though given in the largest doses, are not productive of any benefit to the patients: whereas the debilitating citric acid in a short time puts a stop to the disease, by producing a specific change in the action of the absorbent system.

3, That the scurvy is a disease of the lymphatic system is also clear from its symptoms. For the disease is in general accompanied with œdematous legs, the anasarca is likewise a frequent attendant upon it, and the termination of the scurvy in dropsy is very common.

Dr. Lind, in conformity to the common opinion; attributes, it is true, these symptoms to profuse evacuations of dissolved blood: but this is an erroneous idea, wholly refuted even by his own observations; for he assures us, “ that he had bled at
 “ different times above a hundred patients in all
 “ the different stages of the disease, having even
 “ ventured in the last stage to take away an ounce
 “ or two of blood in order to inspect the condition
 “ of that fluid in dying persons.” And upon the whole he has observed, that “ the blood of those, who
 “ were seized with the scurvy after a fit of sickness,
 “ or a fever of long continuance, was generally of
 “ a soft and loose texture. But the blood of most
 “ other scorbutic patients was in a natural state;
 “ there was generally, after it had stood some time,
 “ a perfect separation of the water or serum from
 “ the red concremented mass; the latter even in the
 “ last stage of the disorder was firm, and compact, and often covered with some white streaks,
 “ or what is commonly called the gluten or size of
 “ the blood *.” The doctor’s observations thus evidently show, that these symptoms are not owing to the dissolved state of the blood, but to the morbid condition of the lymphatic system.

4, That the irritability of the absorbent system is preternaturally increased in this disease, is evident from the extreme sensibility of the scorbutic patients to the qualities of the air: for they always feel themselves very uncomfortable, when exposed to a colder atmosphere; all the symptoms of the

* Lind, postscript, sect. 3, p. 512.

disease are increased by a cold, damp, and rainy air, and on the contrary are diminished by a dry and hot one. This opinion is farther confirmed from the distemper's being remedied by the acid fruits, which seem to counteract the morbid irritability of the absorbent system by removing the morbid stimulus.

5, In fine, the dissections of scorbutic bodies demonstrate beyond dispute, that the disorder derives it's origin from a specific alteration, which the absorbents, particularly the lymphatic glands, have undergone. For in such bodies the glands of the liver, spleen, and more especially of the mesentery, are always found enlarged, specifically altered, and often either wholly indurated, or ulcerated. Tubercles also are frequently met with, both in the lungs, and in the kidneys, from a translocation of the disease *. All which leave no room to doubt as to the primary seat of the scurvy.

The theories, which have hitherto prevailed with medical writers in order to account for the proximate cause of the scurvy, are chiefly the three following.

1, That the scurvy is owing to general debility, or diminution of the vital principle: an opinion, the contrary of which has already been clearly demonstrated.

2, From the most ancient authors till within these few years the scurvy had been classed among

* Lind, l. l. p. 244 and 245.

the putrid diseases. Even the great Cullen, otherwise such a strong advocate for the doctrine of the solids, is of opinion, that the proximate cause of this disorder is owing to an evolution of a large quantity of saline matter, and a strong propensity of the blood to putrescence brought on by the use of animal food, especially by the living upon salt provision.

That this opinion is void of all foundation, the consideration of the following arguments will manifestly prove.

The scurvy in it's commencement shows no other symptoms but such as are owing to the debility of the solids, and the torpor of the vital principle: and no change of the fluids appears, except in parts in which the disease has already made great progress, as for instance the gums; and, strictly speaking, the morbid state of the gums belongs to the second stage of the scurvy, in it's first stage the gums appearing sound,

The blood of scorbutic patients, though it is manifestly of a darker colour, yet, even in the last stage of the disease, has no peculiar smell, is firm and compact in it's texture, coagulates in the usual way, and does not sooner grow putrid than other blood in the same degree of heat: all which phenomena are inconsistent with a putrescence of the fluids.

A great difference exists between the symptoms of scurvy, and those which accompany putrid dis-

cases: for in putrid diseases the appetite is gone, and fordes of the *primæ viæ* are almost constantly found; on the contrary in the scurvy the *primæ viæ* are very often clean, and the appetite is generally vigorous till death. Febrile commotions always attend putrid diseases; but they are wanting in the scurvy, when not complicated with some other disease. Dr. Lind observes, that the scurvy is altogether of a chronic nature, and that fevers may be justly reckoned among its adventitious symptoms*.

In fine, the scurvy is soon cured by using fresh vegetables, and the patients are quickly restored to perfect health by a plentiful use of them. It makes little difference of what kind these plants are, if only fresh, and of a nature to admit of a copious use of them: acid and alkaline, mild and pungent, sweet and bitter, equally cure the scurvy; though their sensible qualities are quite opposite, and the effects, which they otherwise produce on the constitution, different†. Bisset, Lind, and Cullen, though they observe, that the acid fruits, oranges and lemons especially, are far the most powerful in remedying the scurvy, yet affirm, that other plants, even those of the alkalescent tribe, which, though they do not contain alkali in an uncombined state, are greatly inclined to putrefaction, likewise prove particularly useful in the scurvy; and that their use suffices to accomplish a perfect cure of the dis-

* L. l. p. 106.

† Macbride, l. l. vol. ii, p. 389.

ease*. Now it is pretty evident, that such plants cannot possibly correct a putrid diathesis of the blood : a circumstance, which seems to have been entirely overlooked by the advocates of the humoral pathology.

3, Dr. Trotter, physician to his majesty's fleet under the command of lord Howe, has lately advanced a new theory on the proximate cause of the scurvy. This able physician observing the blood of scorbutic patients to be always of a darker colour, often bordering upon black, and the quick removal of the highest degree of scurvy by acid fruits, especially by the juice of oranges and lemons, was led to the idea, that the proximate cause of scurvy is a want of the due proportion of oxygen in the blood ; which is restored to the circulating fluid by using fresh vegetables, especially acid fruits. Having thus ascribed the scurvy to a want of oxygen, he is greatly embarrassed to assign the reason, why every acid is not equally effectual in the cure of the disease, why acids, which possess much more oxygen than the lemons, are nevertheless of no efficacy at all in putting a check to the disorder. To reconcile this fact with his theory, he supposes, that, by increasing the proportion of oxygen, or by bringing the radical to a more perfect saturation, their reciprocal attraction is increased ; so that the acids thus saturated with oxygen are incapable of being decomposed in the body, but only act upon the fat, and dispose it to run off by the excretions. The

* Cullen, l. l. § 1804 and 5 : Bisset, *on Scurvy*, p. 102 : and Lind, l. l. p. 194.

doctor is not less at a loss, to explain how this want of oxygen takes place in people breathing an atmosphere containing a large proportion of vital air. To remove this difficulty, he has recourse to another hypothesis: namely, that it is requisite not only to take in oxygen by respiration, but by the stomach likewise; so that the breathing of a more pure air cannot compensate the not taking in of the due quantity by the stomach.

Though this theory at the first appearance seems to be specious, yet to apply this doctrine to account for the proximate cause of scurvy is attended with insuperable difficulties. The doctor's explanations, why a want of oxygen happens in persons breathing a very pure air, and why the acids, which contain a much larger quantity of oxygen than the citric, are of no power at all in checking the progress of the scurvy, are indeed altogether theoretical speculations, and refuted by daily experience. The mineral acids have great efficacy in the cure of putrid diseases; and they are not less efficacious in many other disorders; as for instance in different hemorrhages. Certainly no one will maintain, that in these cases they only act upon the fat, or pass through the body pure and unaltered, as when taken into the stomach. Does the nitrous acid, when exhibited in the lues venerea, pass unaltered through the body? Does not experience teach us, that the powers of digestion are very capable of decomposing vinegar? As thus upon many occasions the mineral acids and vinegar undergo a decomposition in the body, the natural inference must be, that the doctor's explanation of their inefficacy in scurvy from their being incapable of decomposition in the body, falls to the ground.

The

The doctor's supposition, that, though breathing a pure air, it is still necessary to take in a quantity of oxygen by the stomach, is likewise ill founded. For it is at present pretty generally allowed, that the florid colour of the blood depends upon an alteration it undergoes when passing through the lungs, by which oxygen is attracted, and the azote, together with the carbonic acid gas, is expelled. It is likewise proved, that the attraction of the oxygen is always in proportion to the more or less vivid action of the lung-vessels, so that in the same space of time different persons take in a different quantity of oxygen, according to their different constitution. The want of oxygen in the system, and the consequent darker colour of the blood, are therefore owing to a specific alteration the lung-vessels have undergone in consequence of the scorbutic diathesis of the body, by which they less eagerly take in oxygen than in the healthy state; and is by no means to be derived from the not taking in a due quantity of oxygen by the stomach.

The want of oxygen is therefore an effect, and by no means the cause of the scurvy. Indeed if to remedy the scurvy nothing were requisite, but to throw a quantity of oxygen into the system, the natural inference would be, that it was a matter of indifference, whether to cure the scurvy we made use of the citric acid, or of the concentrated acid of tartar, since both these acids stand nearly in the same scale with respect to the affinity of their radicals to oxygen. This however is found by experience not to be the case; and the learned author himself assures us, that, though the concentrated acid of
tartar

tartar approaches very near to the citric acid in all it's sensible qualities, it doubtless does not possess it's medical powers, for it had been given to six drachms a day without the least benefit *. Sugar is well known to contain a large quantity of oxygen: there is no doubt, but that sugar may be decomposed by the organs of digestion: to remove the scurvy, if it consisted solely in the want of oxygen, it would therefore be sufficient, to put the patients upon a sugar diet. But upon trial it has been found, that sugar, though given in the largest quantities, does not check the progress of the disease †. If for removing the scurvy it were only requisite to impart oxygen to the system, we might naturally be inclined to suppose, that mercury would be a very useful remedy in this disorder; as it's different calces soon give out their oxygen. Mercurials, however, far from having any efficacy in the disease, prove hurtful to the scorbutic. It needs scarcely to be observed, that the scurvy may arise, where fresh provision is not wanting; and that salt provision contains a pretty large quantity of oxygen; as the above remarks are very sufficient to show, that this theory is altogether groundless.

It appears thus, that the scurvy is not produced either by a general debility of the system, by a tendency of the blood to putrefaction, or by the want of oxygen; but that the disorder is brought on, when the debilitated lymphatic system is specifically acted on by some morbid stimulus, so that, having undergone a specific change, the conglobate glands

* Trotter, *Medical and Chemical Essays*.

† Trotter, l. l.

secern a specific matter partaking of the scorbutic character.

The scorbutic disposition of the lymphatic system produces the following effects.

1, The spasmodic contraction of the lymphatics, and their irregular motions, put a stop to the absorption of the secreted humours. The absorbents either slowly propel or effuse in some place the contained fluid; whence œdematous legs in most cases accompany the disease, and anasarca, ascites, and hydrothorax are frequently it's consequences; for, according to the observations of Dr. Poupart, in most of those, who had laboured under a difficulty of breathing, a certain quantity of water or serum, more or less according to the degree of oppression, was found*.

2, As a fluid partaking of the scorbutic character is continually generating by the specifically altered lymphatic glands, the chyle, during it's passage through the lymphatic system, is contaminated with it; the infected chyle, entering the sanguiferous system, communicates the taint to the blood, which, being conveyed through the whole body, specifically acts upon the solids; and the solids, reacting on the fluids, alter their whole crasis, and bring about the scorbutic diathesis, the chief consequences of which are the following.

1, The scurvy excites transient pains in the cavities of the thorax and abdomen, often shifting to opposite sides. On account of the pre-

* Lind, l. l. pt. ii, chap. vii, N. 3 & 4.

ternaturally increased irritability of the lymphatic system, the scorbutic patients are very sensible to the different qualities of the atmosphere, and extremely liable to other diseases, which rage at the same time with the scurvy. From the same source it may be accounted for, why those, who have laboured under a high degree of the scurvy, are afterwards subject in different periods of their lives to habitual rheumatism, pain and stiffness in their joints, and sometimes to cutaneous eruptions; and are afterwards much sooner attacked by the scurvy than others. It has been generally supposed, that in the scurvy the blood was changed into a thin dissolved red humour; that it's serum became greenish, and acrid to the taste: but at present it is clearly proved, that the blood is as firm and compact as usual, though it is of a darker colour, and that it's serum is insipid*. The circulating mass being infected, the secretory organs must of course likewise partake of it's alteration from the healthy state: accordingly, the breath becomes offensive, the sweat, when any appears, is viscid and fetid, the stools are extremely stinking, and the urine becomes fetid and high coloured; in a word, all the secretions partake in a greater or less degree of the depraved crasis of the blood. The vital powers, attempting to expel from the body the morbid matter, deposite it partly at the surface, where, according to the different reaction of the discerning organs, it assumes a different form; hence the scorbutic exanthema may be light blue, purple, petechial, military, or erysipelatous. The livid spots, however,

* Lind, l. l. p. 512.

which appear between the muscles in the extremities, are generally nothing but effused blood, poured out by the vessels giving way even to the usual exertions of the muscles. From the attempt nature makes to get rid of the morbid matter is also to be explained, why sometimes in the convalescent there is observed an eruption of numerous small pimples, containing either a purulent or watery fluid, while in many other cases a dry scurf appears on the head and face*.

2, The scorbutic matter, acting on the lymphatic glands, excites in them a chronic inflammation, often terminating either in a suppuration, or in a total destruction of their organic composition. What effects it has on the lymph, for want of observations, I am incapable of determining.

3, A translocation of the disease takes place to different organs, especially the lungs and kidneys; which also contributes to the difficult respiration, and the violent painful constriction of the thorax, and causes the severe strangury so often observed in this disease, which sometimes proves fatal.

The prognosis of the scurvy differs according to the different stage of the disease, its different complication with other disorders, and the different constitutions of the patients. In general the disease is soon removed by the use of fresh vegetables in the first stages: in the last stage, however, a severe oppression of the breast, and great difficulty of respira-

* Lind, l. l. p. 117 & 136.

tion, often indicate an approaching phthisis or dropfy. All complications with other diseases no doubt make the scurvy worse, yet it's conjunction with the putrid fever is the most to be feared of them all *. Lastly, great attention is to be paid to the constitution of the patient, because, *ceteris paribus*, persons, in whom the tone of the solids has been impaired by previous diseases, are much less capable of bearing up under the scurvy, than sound and robust men. But the scurvy, when curable, is much sooner remedied than any other disease; and the patients, even in the last stage of the disease, are restored to perfect health within a few days.

The indications of cure in the scurvy are the two following.

1, The scorbutic disposition is to be removed, and such a state of the solids is to be induced, that the morbid matter may be separated from the mass of fluids.

2, The morbid matter is to be expelled from the body by diaphoretics, diuretics, and gentle purgatives.

These indications are answered by using fresh vegetables, especially acid fruits, in the first stages of the scurvy: for as soon as the scorbutic disposition is removed by their use, the apparent debility of the solids soon disappears, nature spontaneously expels the morbid matter, and thus a stop is put to

* Stoll, l. 1. p. 5.

the disease. But in the last stage physic should succour nature by the use of gentle purgatives, diuretics, and diaphoretics, in order to accelerate the cure: though the scurvy, even in it's last stage, may be removed by the use of fresh herbs, or acid fruits alone, without any other remedy. Bleeding, emetics, and strong purgatives, are always injurious in this disease, which does not bear strong evacuations.

When I say, that a plentiful use of acid fruits suffices to accomplish the radical cure even in the highest degree of the scurvy, I wish to be well understood: for, as it is a fact, that persons, who were healthy and strong before the scurvy made it's attack upon them, are perfectly restored by the use of acid fruits, and need no tonics; yet, on the other hand, persons, who have been weakened by other diseases before they are afflicted with the scurvy, though the scurvy is removed by the use of the antiscorbutics, remain as weak as they were previous to it's appearance, such persons, therefore, stand in need of the bark, aromatics, tonics, bitters, and chalybeates, to prevent their being afterwards so easily affected by the morbid stimuli. Nay, sometimes, especially in the scurvy which appears on shore during the winter, the predisposing causes, which all operate by debilitating the system, have such a considerable share in producing the disease, that it becomes necessary to give aromatics and tonic bitters along with the antiscorbutics from the commencement of the disease. Indeed I have frequently seen the scurvy attack poor people living principally on potatoes, with occasionally a little pork, in whom the disease chiefly originated from debility brought

on by fatigue, cold, moisture, and want of cleanliness. In these cases, if the use of tonics be neglected, the patients are but slowly cured; and though the scurvy is removed, yet the convalescent retain the predisposition to the disease, and, as soon as an exciting cause acts upon their weak bodies, the scurvy returns afresh. It is therefore often advisable in these cases, from the very commencement of the disease, to combine the antiscorbutics with tonics.

Fresh vegetables and acid fruits are thus found to be the best means both of preventing and curing the scurvy: but it is greatly to be regretted, that this disease chiefly rages at sea, during long voyages, and where often neither fresh vegetables nor acid fruits can possibly be procured. The question therefore is, whether it be possible to prevent seamen from being attacked with the scurvy during long voyages, and what are the proper means: a matter in reality of the first importance to a very valuable part of mankind, the seamen of all nations. It is to be recorded, to the immortal honour of the present board of admiralty in Britain, that it has paid the strictest attention to the medical department of the navy; and that, in order to preserve the men from the scurvy, fresh vegetables and live cattle have been frequently dispatched in frigates to the different fleets cruising on foreign coasts; in consequence of which the scurvy has scarcely appeared for some months. This must of course be acknowledged as the most effectual method of preventing this fatal disorder; but as these precautions cannot always be put in practice, because many ships, and even whole fleets, are frequently at such a distance from home, as not to admit of being thus
sup-

supplied; the question still remains, what is to be done in cases, in which fresh vegetables and acid fruits cannot be had, to prevent and cure the scurvy?

In reply to this I answer, that I have no doubt, but, by adopting proper regulations, the scurvy may be always prevented from raging among seamen; and, when attacking some individuals, may likewise be readily stopped by proper treatment. The means, by which this desirable end may be obtained, follow as it were naturally from what I have proved of the nature and cause of the disease; for the prevention of the scurvy, like that of all other complaints, depends upon an accurate knowledge of the noxious powers which produce it, and of the proximate cause of the disorder. The remote causes are either predisposing, or exciting.

The chief predisposing causes are fatigue, preceding disease, want of cleanliness, cold, and moisture: of which the last two are the most powerful predisposing causes of the scurvy, and have commonly a considerable share in producing the disease. Indeed it is well known, that the scurvy in general makes it's appearance after storms, or cold rainy weather. Dr. Trotter is so well aware of this fact, that he says "every officer, who knows his duty, " will be as cautious as service will admit of in " exposing his ship's company to either cold or " rain." The expedition under the command of lord Anson affords a striking instance, that cold and moisture is capable of producing the scurvy, though fresh vegetables are not wanting. Dr. Lind observes, " that warrant officers, though obliged

“ to live upon the same provisions as common
 “ sailors, yet by lying in dry cabins, and going
 “ better clothed, mostly escape the scurvy on ac-
 “ count of the perspiration being kept uninter-
 “ rupted.” This shows us, what influence the
 predisposing causes generally have in producing the
 scurvy, and gives us a hint how to counteract them.
 Namely, the strictest attention must be paid to keep
 both the ship and the ship’s company as clean and dry
 as possible; and all the sailors must be provided with
 flannel shirts worn next the skin, thick woollen trow-
 sers, and worsted socks in order to prevent the cu-
 taneous vessels from being so violently acted upon
 by the noxious stimuli. Every sailor ought to have
 at least two pair of woollen trowsers, two flannel
 under waistcoats, and several pair of worsted socks,
 in order to change his wet clothes for dry, after
 having been exposed to cold rainy weather. Seamen
 observing these precautions will not only in general
 escape the scurvy, but be likewise much less suscep-
 tible of being attacked with the dysentery and re-
 mittent fevers. This I have not only observed my-
 self, but it is also remarked by the sagacious phy-
 sician, whose opinion I have attempted to refute*.

The most powerful exciting cause of the scurvy
 is the living upon salt provision. This is to be
 counteracted both by medicines, by increasing the
 vegetable part of the diet, and by bringing the ve-
 getables as nearly as possible to their recent state.
 To express myself more clearly, it ought to be ob-
 served, that the exciting causes of the scurvy ope-
 rate by specifically stimulating the lymphatic system,

* Trotter, l. l. p. 180.

the consequence of which is, that the lymphatic glands undergo a specific change, and secrete a specific fluid, partaking of the scorbutic diathesis. We have seen, that cold and rain have a considerable influence in producing this disease. Dr. Lind found perspiration to be a very salutary evacuation in the scurvy. Gentle laxatives are also, as is well known, of a considerable benefit in this disease. In fine, it has been proved, that, in the scurvy, the morbid matter is often discharged in part from the mass of the fluids by the *natura mediatric*, and carried to the surface; and hence, in the convalescent, not unfrequently pimples or dry scurf appear on the head, face, and other parts of the body. The natural inference therefore must be, that a remedy, possessing not only a laxative and diaphoretic quality, but which likewise has an alterative virtue, and clears both the lymphatic and sanguiferous systems, by keeping up a determination to the surface, cannot but be productive of the most salutary effects. Such a remedy may be found in sulphur, the laxative and diaphoretic powers of which no person will question, for the fæces, the sweat, and even the insensible perspiration, acquire a singular smell by its use. This is farther proved beyond all doubt by its efficacy in diseases frequently excited by external causes, such as cold and moisture; for instance in catarrh, rheumatism, and gout. That it likewise operates both on the lymphatic and sanguiferous systems, is evident from its efficacy in cutaneous diseases; from its virtue in cases of repelled eruptions, in which it often brings them back again to the skin; and from its stimulant power, by which it is found so salutary in many complaints of the lungs to promote expectoration.

If we farther compare the medical qualities of the sulphur with the symptoms accompanying the scurvy in it's commencement, such as listlessness to all exercise, dry rough skin, stiffness and feebleness of the muscles, especially of the knees, *a priori*, no doubt will remain, but that the sulphur must be efficacious both to prevent the disease, and to put a stop to it's progress in the first stages. Upon these principles I exhibited the sulphur to several scorbutic patients, without having recourse to the concentrated acid of lemons, or to other antiscorbutics, and it invariably succeeded in removing the disease in it's first stages. In a few cases I gave the crystals of tartar along with it; and this conjunction seemed to accelerate the cure. It is true, that these trials have been made on shore, on the scurvy occurring during the winter; but as the sea and land scurvy are exactly the same disease, and differ only in the degree of violence; and as the medical powers of sulphur are suited to the causes and nature of the disease; this drug will doubtless be found as efficacious in preventing the scurvy at sea, as I have found it to be on shore. I would therefore advise, in order to prevent the scurvy, to give every man on board a ship half a drachm of sulphur twice a day. This is an article, which may be procured almost every where; and a whole navy can be provided with a sufficient quantity at a very small expense.

But though the sulphur no doubt will prove useful in preventing the disease, and putting a stop to it's progress in the first stages, yet as a preventive of the scurvy at sea, where frequently many powerful

erful causes cooperate in producing the disease, it would not be safe to trust to this medicine alone, without paying at the same time the utmost attention to the vegetable part of the seamen's diet. For though this medicine would generally prove sufficient to prevent the disease in strong healthy constitutions, which had never before been attacked with it, it would no doubt be insufficient to keep off the scurvy from debilitated persons, or those who in former voyages had laboured under it in a high degree, all of whom are very liable to this disease.

Accordingly the stimulus given to the lymphatic system by salt provision is to be counteracted by the use of sour krout, an excellent antiscorbutic, which is frequently used on board the dutch ships: and it is remarkable, that the seamen of the United Provinces, even at a time when their navy was in a very flourishing state, and they had many ships at sea in every part of the world, were comparatively much less subject to the scurvy, than those of any other nation. Dr. Lind, who introduced it into the british navy, saw such striking effects from it, that he goes so far as to say, "after the cabbages are washed, their virtue is the same as if taken fresh out of the garden." Though this expression is no doubt too strong, and the efficacy of sour krout is not so great as that of fresh vegetables, yet I have myself frequently observed good effects from this preparation, when given on shore in the winter. If therefore it's antiscorbutic powers in some cases have been but very trifling, this was doubtless owing to it's having been either not well prepared, or not well dressed.

Other correctors of salt provision are onions, recommended by Dr. Milman, pickles of red cabbages, cucumbers, and french beans, the antiscorbutic qualities of which are so elegantly detailed by Dr. Trotter. These, being prepared in the usual way, are to be served on the days that salt beef and pork are issued to the ship's company. Gooseberries, taken from the bushes in a somewhat unripe state, and carried to sea, have been known effectually to put a stop to the scurvy. The expressed juice of red currants properly bottled may also be taken in a certain quantity on board of a ship, and would probably prove a powerful antiscorbutic. It is true, that, on account of the cost, a general supply of the last two articles to a navy is scarcely practicable; yet a fleet may be provided with a certain stock of them without any considerable expense, and they may be occasionally distributed either to those who are predisposed to the scurvy, or when, on account of many powerful causes cooperating together, it is to be feared, that the disease will make it's appearance.

Pure water may justly be ranked among the chief preventives of the scurvy. Of the best means to preserve it in that state, to correct it when corrupted, and to freshen salt water, Dr. Trotter has lately treated so fully, that I shall pass by this subject in silence. The supplying of the navy with common table beer, made somewhat stronger than usual, would likewise be found of the greatest service*: but it is to be lamented, that a man of war can scarcely be supplied with it for more than six weeks at most. It has been proposed to serve out

* See the observations of Dr. Blane, *on the Health of Seamen*.

chocolate to the sailors for their breakfast, and the advantages, which would result from this, have been elegantly detailed by Dr. Trotter. But I am afraid, that, on account of the considerable expense, it's general introduction into the victualling of the navy is not to be expected. What I apprehend might be substituted in it's place is strong coffee. It is doubtless evident, that the coffee does not possess the virtues of the cocoa; but still it would be very comfortable for a sailor, on coming from a wet deck in a rainy morning watch, to have a cup of strong coffee along with his breakfast.

If these regulations were carried into execution; and if those correctors of salt provision, which I have taken the liberty to recommend, were given along with biscuit, flour, raisins, oatmeal, and pease, the common vegetable part of sea-diet; though I do not venture to say, that the scurvy would be cured or prevented on all occasions; yet I have not the least doubt, but that, by observing the rules I have attempted to lay down, the scurvy would always be prevented from raging among seamen, and that in general the attending to them would be sufficient to cure the disease in it's first stages. But as for the cure of the scurvy no remedy is so powerful as lemons and oranges, and as the virtues of the citric acid concentrated either by evaporation, or what is much better by congelation, may be preserved for the longest cruise, in all long voyages every ship's company ought to be provided with a certain quantity of it, and as soon as the other remedies are found to fail, recourse should be had to this salutary preparation, which with the greatest

propriety may be called the specific for the scurvy.

In speaking of the correctors of salt provision I have not taken any notice either of the elixir of vitriol, or of malt; though the whole of the british navy is still supplied with both these articles. The first was introduced into the british navy on the suggestion of the late Dr. Huxham. But, as this remedy was advised on the erroneous idea, that the scurvy consisted in a tendency of the blood to putrefaction, so all practitioners at present agree, that in the scurvy it is of no use at all. The malt was supplied to the ships upon the recommendation of Dr. Macbride: and though, on the first trials, we were told it was attended with much success, yet Dr. Lind found it not to cure one out of one hundred and thirty sailors to whom it was given*. Dr. Trotter never saw it's use attended with any good effects†. I have seen it tried myself in several cases, but I never observed the least benefit from it. Therefore, without questioning the veracity of those gentlemen, who established the credit of the malt, I cannot help thinking, that it might be advantageously laid aside for the preparations I have attempted to recommend.

In fine, while laying down rules to prevent the scurvy, I have not taken notice of indolence and lowness of spirits, though these often powerfully co-operate in the production of the scurvy. The reason is, that the cure of these belongs rather to the department of the officer, than of the medical man; for, as Dr. Trotter very justly remarks, it is in vain

* L. l. p. 539.

† L. l. p. 190.

for physicians to prescribe rules of health, if the commanders of the ships do not pay regard to preserving the health of the ship's company by proper regulations, and, by studying the character and dispositions of the human mind, comfort the sailors, and become the friends and the fathers of the seamen under their command.

With respect to the manners of dying in the scurvy, they are numerous. The disease frequently terminates in dropfy, or phthisis. Some are carried off either by a colliquative diarrhœa, or a mortification succeeding to inflammation of the bowels. Others die of hemorrhages, in which cases the blood runs as it were out of a sponge through the whole surface of some organ, although, when the parts are cleaned, scarcely the least trace appears, whence the blood flows. It is by no means wonderful, that such patients, having already suffered under so many symptoms, are incapable of bearing the loss even of a moderate quantity of blood, and often expire in the midst of it's effusion. Many are destroyed by suffocation, which happens in two ways; either when the lungs, already greatly weakened by the scorbutic diathesis, become inflamed, and this spurious excitement of the vital principle, distending the lungs, brings on sudden death by impeding respiration; or when this inflammation of the lungs terminates in an effusion of serum into the cavity of the thorax, by which respiration may likewise be stopped. Lastly, others die of syncope, brought on either by using exercise, or by a change of air. In both these cases the velocity of the blood is accelerated, and a much greater quantity
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returns at once into the right cavities of the heart, and thence into the lungs, but the weakened vessels of the lungs being incapable so quickly to transmit such a considerable quantity, the blood becomes accumulated in the sinus venosus, and right auricle and ventricle of the heart, which causes a laborious respiration and panting; an effort being made by all the powers subservient to respiration, to dilate the breast more fully and frequently, for the passage of this increased quantity of blood; which effort, when unsuccessful, terminates in a fatal syncope: and hence may be explained, why in these cases the right auricle and ventricle are always found filled up with coagulated blood.

GENUS IV.

Aneurism.

EVERY soft tumour arising in an artery is in an extensive sense named aneurism.

The causes of this complaint are either external or internal. Wounds, luxations, fractures, blows, falls, straining to lift a heavy weight, in short, whatever impairs the tone of the vessels, or produces their rupture, by external violence, belong to the former; and all these may occasion an aneurism even in a strong healthy person. The internal causes are whatever diminish the tone of the vessels,

or,

or, by disturbing the circulation, drives the blood forcibly to some part. Hence the plethoric, the hypochondriacal, and the hysterical, are more disposed than others to this disease. As, however, these morbid states frequently exist without occasioning an aneurism, a certain predisposition to this disease seems to be requisite, without which these noxious powers are incapable of producing an aneurism. Such a predisposition probably consists in a certain degree of debility of the sanguiferous system. This may depend upon a determinate structure of the primary constitutive parts of the body; in which case it sometimes seems to be hereditary: at least Lancisi records, that he has observed such an hereditary disposition in a noble family, in which four succeeding generations, namely, the great grandfather, the grandfather, the father, and the son, were afflicted with an aneurism*. Or the weakness of the sanguiferous system may be owing to previous diseases, by which the tone of the vessels is impaired: for instance, the scurvy, lues venerea, &c. This complaint either takes place in several parts of the body, or it is confined to one part, according to the different state of the sanguiferous system.

The diagnosis of this disease is often difficult, when the aneurism takes place in the principal vessels in the vicinity of the heart: yet a pulsation of the tumour synchronical with the other arteries, a heavy pain in the breast not unfrequently extending itself between the shoulders towards the ver-

* Lancisi, de *Mot. Cord. & Arteriar.* prop. 45.

tebræ, palpitation of the heart, a small weak pulse, tension of the abdomen, and sometimes relief of the symptoms by bending the body forward, are often to be observed.

The effects of this disorder are giddiness, apoplexy, a severe cough, hemoptysis, syncope, difficulty of breathing, anxiety, suffocation itself, tabes, phthisis, and hydrothorax; besides, in general, in this disease when inveterate, the cartilages, and the bones themselves, from the pressure of the dilated artery, are affected by caries, and often in great part consumed by absorption.

In the prognosis of the aneurism the following circumstances should be taken into the account.

1, The species of aneurism: for, *ceteris paribus*, the true is the most dangerous; the spurious afford greater hope of cure; and the varicous in general is not attended with any danger.

2, The different causes that have brought on the aneurism: since, if this malady appear without any external injury, or too violent exertion, it is to be feared, that it's origin is owing to a fault in the organic structure of the solids; in which case the removing of the aneurism, either by compression or ligature, is generally useless; because a new aneurismatic tumour is in a short time generated in another place, in consequence of the ill formation of the solids. Thus in such cases the palliative cure alone is to be adopted.

3, The

3, The seat of the aneurism. If it take place in a part where neither ligature nor compression can have the least effect; if the artery be so large, that it might be apprehended the patient would die before the hemorrhage could be stopped; for instance, if the aneurism exist in the arteries either of the thorax or abdomen, the disease is desperate: since, though the coats of the aneurismal sac become greatly thickened, and are rendered stronger, cartilaginous and osseous films are apposed to them, nay the rushing out of the blood is prevented by it's coagulation itself, and thus life is supported for some time: the disease has nevertheless always a fatal termination.

4, The age and constitution of the patients. In youth, when the solids are still soft and flexible, the system easily accommodates itself to various changes; it may be expected, therefore, that, the course of the blood being impeded through the aneurismal trunk, the collateral branches will be dilated by the blood, and from this dilatation the organ, the artery of which is tied, would be nourished as well as before. But in a more advanced age, the solids, having already attained to great rigidity, suffer no more extension; for which reason the event of the cure then proves for the most part unfortunate. Besides, it is requisite, at least when the operation of the aneurism is to be performed, that the patient possesses sufficient strength, because otherwise he will not be able to support the effects of the operation, but will die in the course of some days, from a mortification of
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the affected part taking place, or in consequence of the general irritation produced by it.

On the treatment of this disease there is only to be said, that the aneurism of the vessels of the breast and abdomen admits of no cure, farther than a palliative one; which is accomplished by bleeding, gentle purgatives, anodynes, antispasmodics, a very spare diet, and the greatest tranquillity both of body and mind. The cure of the aneurismal tumour of the other parts is to be attempted either by tying the artery sending blood to the aneurismal sac, or by compressing the sac itself, by which latter method Guattani has cured many aneurisms even in an inveterate state: of course the practitioner should always try the effects of compression, before he has recourse to the operation, unless the indication of performing it be urgent.

If the aneurism be incurable, the pressing column of the blood sooner or later overcomes the resistance of the coats, by which the aneurismal tumour is sustained, and a rupture of the aneurism takes place. When this occurs, the patient sometimes dies in a moment, a torrent of blood rushing out: at other times, indeed, life may be protracted for some time, even for a few months, by powerful applications; however, as a fresh quantity of blood flows at intervals out of the ruptured artery, at length, the vessels being left almost destitute of blood, death ensues*.

* Morgagni, l. i. T. iii, lib. iv, epist. 50, n. 11 & 12.

GENUS V.

Mortification.

MORTIFICATION is a high degree of atony, succeeding to the inflamed state of some part. It may be either incomplete or complete. In the first case, though the affected organ is of a livid blackish colour, and generally soft and flaccid to the touch, yet the part still enjoys a slight degree of life: in the latter all sensation and life of the affected part are entirely lost, it turns totally black, and emits a considerable foetor. The incomplete mortification is called gangrene; the complete, sphacelus.

Gangrene differs from sphacelus only in degree; as a spark of life still remains in the former, whereas in the latter life is totally destroyed. Gangrene does not always change into sphacelus, and may be cured without any loss of the parts, the affected organ being restored to it's due tone by proper means: whereas the sphacelus is only to be remedied by the separation of the dead part from the living.

The causes of mortification may with propriety be reduced to the four following classes.

1, Inflammations, either phlegmonous or erythematic. The phlegmonous inflammations, indeed, seldom change into gangrene, when properly treated in their commencement: but either by neglect

neglect or injudicious management they often terminate in mortification. On the contrary the erythematic have usually a strong tendency to gangrene, and often run directly into mortification: for which reason the erythematic inflammations are in general more to be dreaded than the true phlegmonic.

2, Stoppage of the circulation of the blood, and of the action of the nerves. This commonly happens from compression of some kind or other, as from tumours, convulsions, ligatures, in a word any cause capable of obstructing the chief arteries, that are destined to supply any part. It is however by no means requisite to mortification, that the stoppage of the circulation be complete; for it is often sufficient, that it only becomes in a great degree diminished. This is proved from the mortification occasioned by debility of the general system, and by the contraction and ossification of the sanguiferous vessels, which, though not wholly stopping the circulation, nevertheless frequently bring on gangrene. The gangrene to which old people are liable is a similar case.

3, External injuries either destroying the whole structure of the part, or producing atony of it. Wounds, intense cold, burning, too long confinement in a recumbent posture, &c. are of this kind.

4, The translation of any disease to some part of the body forms the fourth class. This is always owing to an imperfect crisis, the consequence of nature's being disturbed in the attempt to expel the
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the morbid matter from the body: for the *natura mediatrica* being hindered in it's action, the morbid matter, instead of being discharged from the body by the emunctories, is deposited on some organ, exciting thereby it's stimulus inflammation and gangrene. The gangrene of Pott seems to belong to this order, as being a catarrhal affection deposited by translation on the feet. At least this opinion is strengthened both by the testimony of Pott, that those, who before had suffered vague rheumatic pains, were more affected with this complaint than other persons*; and by that of Mr. Mulder, who observed a similar gangrene in several dutch sailors, after a catarrhal fever †.

Though for the sake of order I have ranked the causes of mortification under four general heads, yet I am very much disposed to doubt, whether mortification ever can take place without any preceding inflammation; though the degree of inflammation is often so slight, and passes so quickly away, as not to be observed.

The prognosis in mortification is doubtful, and the patients are always in danger till the dead parts are separated from the rest of the body. The danger nevertheless differs,

1, According to it's different cause. For, since the mortification itself cannot be stopped, before it's cause is removed, it naturally follows, that the patients are in a greater or less danger in propor-

* L. l. pt. i, p. 65.

† L. l. pt. ii, p. 84.

tion to the difficulty of removing it's cause. Hence, *ceteris paribus*, the mortification arising from an external cause is attended with less danger, than that originating from an internal: the sphacelus, which arises from metastasis of some morbid matter, is, in general, not so ominous, as that brought on by an incarcerated hernia; unless the translation of the disease take place on some viscus.

2, According to the different part. Since, if the mortification take place in any organ, the function of which is necessary to life, it quickly destroys the patient; as is proved by the gangrene of the viscera: though, when the mortified spot is but small, life may still be protracted for several days, and sometimes the patient may even recover.

3, In proportion to the extent, and depth of the affected part. For it is evident, that, where the gangrene is neither profound nor extensive, the prognosis is much more favourable, than when the mortification runs deep, and spreads greatly.

4, According to the strength, constitution, and age of the patients. Thus the gangrene of the scorbutic, and cachectical, though brought on by an external cause, often kills; and that either depending upon a general debility, or old age, has usually a fatal termination.

The indications of cure in mortification are the three following.

1, The progress of the disease is to be stopped.

2, The

2, The separation of the dead part from the rest of the body is to be promoted.

3, The ulcer remaining is to be consolidated.

In the first place the cause of the mortification should be accurately inquired into: for, if the disease be produced by a scorbutic, or scrofulous, diathesis, or by any other internal cause, the mortification is kept up as long as it's cause remains. The remedies employed to remove the morbid state are to be suited to the different causes of the mortification. Hence antiscorbutics prove beneficial to the scorbutic; the medicines recommended in the scrofula are to be prescribed in the mortification originating from this source; if repelled cutaneous eruptions have occasioned the disease, they are to be brought back again to the surface; suppressed evacuations, when causing this disorder, must be restored; in a word, various medicines are to be employed according to the different circumstances. But if the cause of the mortification do not appear, or have been removed, the treatment is to be guided by the nature of the symptoms, and the constitution of the patient. Thus if a quick, full, hard pulse, and the other symptoms of inflammation, still continue, far from having recourse to the stimulating plan, the practitioner should persist in the antiphlogistic regimen. Due caution however ought to be observed, not to carry the antiphlogistic treatment too far; as the inflammatory state often passes quickly away, and torpor of the vital powers succeeds. The bark, therefore, and other tonics, though on some

occasions they may be hurtful in the commencement of the disorder, are always found very beneficial in it's progress. If a gastric fever be united with the mortification, the *primæ viæ* are first to be cleansed; and afterwards, to support the strength of the patient, the bark and tonics are to be given. If the general relaxation of the vital powers, and a tendency of the blood to dissolution appear, wine, camphor, ammonia, the bark, the white willow, leopard's bane, &c., are to be employed. The white willow is said to surpass even the bark in efficacy: but, though I do not in the least doubt it's tonic quality, it seems to me very erroneous, to attempt to demonstrate from experiments made upon veal, and the human blood *, that it possesses greater efficacy in the cure of putrid disorders than the bark itself; since medicines operate in a very different way in a living body to what they do out of it; and those remedies, which best prevent putrefaction out of the body, often, when taken internally, enjoy the same power only in a small degree. Of this, for brevity sake, one instance will be quite sufficient. Sir John Pringle observes, that to preserve flesh from putrefaction, chamomile flowers surpass the bark in efficacy †: but it is unquestionable, that chamomile flowers are not in the least to be compared with the bark in curing putrid disorders. Hence it is evident, that no conclusion is to be drawn from experiments made either out of the body, or in a dead one, as to the efficacy of any remedy in

* Koning, *Diff. de Cortice Salicis albæ, ejusque in Medicina Usu*, Harderwyk, 1778, cap. iii.

† L. l. *appendix*, pap. 1, exp. 7, and pap. 2, exp. 13.

the living subject: and the less as the antiseptics only resist the tendency to putrefaction in the animal body, in as far as by stimulating the solids they rouse the vital principle into action. If indeed they were to operate by an antiseptic power, certainly a quantity of vitriolic acid, which would be by no means capable of preserving a few pounds of flesh from putrefaction even for one day, would not prove sufficient to cure a person labouring under a putrid fever.

Thus it is evident, of how little weight are the numerous remarks and experiments made upon antiseptic substances by Pringle, and what little dependance is to be placed upon the consequences drawn from them by this eminent physician, with regard to the use of these substances in different diseases of the human body. If the patient be very irritable and inclined to spasm, the wild valerian, musk, castor, ammonia, and opiates, are to be joined with the tonics. Lastly, if the irritability be preternaturally augmented in the gangrene, the physician must likewise have recourse to opium, which, when deemed unable to accomplish the cure alone, is to be given along with the bark. Thus the cure of mortification ought always to be adapted to the circumstances.

Nature herself effects the separation of the dead parts: for, as soon as any part becomes useless, the absorbent vessels are incited to action; a white line is formed, along which the particles existing in contact with the dead part are taken up, and thus the groove of separation is produced.

Accordingly, if the power of nature be sufficient, the physician should merely stand by as an observer: if it need assistance, he ought to support it; not by topical applications, which certainly can be of little use farther than to correct the fetor, being applied to a dead surface; but by duly stimulating the general system by the exhibition of wine and tonics.

With regard to external applications, emollient cataplasms, or astringent lotions, either united with opium, or not, according to circumstances, are useful in the gangrene, when attended with inflammation and much pain: or, according to the prescription of the celebrated Bell, a weak solution of sal ammoniac in oxycrate may be employed, which, in different cases, may be rendered more or less stimulant by the addition of a greater or less quantity of sal ammoniac *. In other cases a poultice, made with the lees of wine, or of beer; or a decoction of the white willow, or the bark, with the tincture of myrrh, may be usefully applied to correct the disagreeable smell, and to rouse the living parts underneath to action.

The healing up of the ulcer, likewise, when reduced to a simple one, is chiefly to be left to nature; and the practitioner ought only to take care, that nothing disturbs it's action. He may however quicken the process of nature a great deal by bringing the edges of the ulcer close or near together by means of sticking plaster. But in order to reduce

* *Treatise on the Theory, and Management of Ulcers*, sect. iv, § v, p. 115 and foll.

the mortified part to the state of a simple purulent ulcer, various remedies may prove useful on different occasions.

Mortification kills in four ways.

1, By the sphacelus of some organ, the function of which is absolutely requisite to life, so that the extinction of the vital principle closely follows it's mortification.

2, The constitution is sometimes suddenly broken down by the violent action of the morbid stimulus; in which case the patient dies unawares, before any vital part has been affected.

3, The same not unfrequently happens, if the noxious stimulus have been applied during a long time to any part; and hence the patients often expire after the sphacelus has been long stopped.

4, The absorbed ichorous matter, unless subdued by nature, aided by proper medicines, and thus discharged from the mass of blood by the different emunctories, weakens the tone of the solids, and incites them into such irregular motions, that a malignant fever is brought on, the symptoms of which are extreme relaxation of the general system, a weak intermitting pulse, a propensity of the fluids to putrefaction, delirium, cold sweats, offensive colliquative stools, convulsions, coma, &c. The termination of this fever is generally fatal.

C L A S S X I.

THE DISEASES OF THE NERVOUS SYSTEM.

NERVOUS diseases are all those in which the animal functions undergo a change from their healthy state without an idiopathic pyrexia. The neuroses may either originate from a morbid state of the brain and nerves; or they may have their primary seat in other organs, and, on account of the delicacy and irritability of the patient, bring on a general affection of the nervous system. I know, indeed, that Cullen states, as a requisite to the neuroses, their not depending upon a local affection of the organs *. If, however, it be considered, that the diseases of the nervous system, far from being averse to a conjunction with local affections of the organs, very often originate from them; that they are not unfrequently kept up by local disorders alone, so that by the removal of these the affections of the nervous system spontaneously disappear, as is proved by epilepsy, and other convulsive disorders, which are sometimes cured by anthelmintics, aperients, and other medicines, that have not the least effect on the nervous system; that the nervous diseases are, in most cases, complicated with a local affection; and that these diseases, though deriving their origin from local disorders, in process of time become idiopathic, so that, though the cause of the com-

* *Synop. nosolog.* class 2, p. 181.

plaint be taken away, it's effect, the nervous disease, remains; it seems to me very incongruous, to exclude the sympathetic nervous disorders from the class of the neuroses; and the more, as they are very often so complicated by nature, that the physician is at a loss to determine, whether it be an idiopathic or sympathetic nervous disease; and in other cases, leaving the local affection to itself for a time, must turn all his attention to the cure of the nervous disorder.

All the nervous complaints, though arising from very different and even opposite causes; and though differing in degree of violence, according to the different morbid stimuli applied; yet, as to their effects, operate only in two ways, and always produce, in a greater or less degree, either atony, or spasm. This class therefore, as it were, spontaneously divides itself into two orders; in the first of which the functions of the nervous system are always either partially or wholly interrupted; whereas in the second an excess of the nervous powers, in a lower or higher degree, takes place.

Before I proceed to inquire separately into these, I must beg leave to observe, that it is of some importance in the practice of physic, to distinguish properly between the sympathetic nervous disorders, and nervous symptoms. It is true, indeed, that a great analogy exists between them, yet they may be discriminated by the following characters.

I, The sympathetic nervous disorders do not belong, strictly speaking, to the nature itself of the disease,

disease, in which they are observed: the nervous symptoms, on the contrary, are to be looked upon as immediate effects of the morbid state; and by no means to be separated from the malady, on which they attend.

2, The sympathetic nervous diseases very often change into idiopathic ones: whereas the nervous symptoms generally disappear together with the primary disease itself.

3, In the sympathetic nervous diseases the physician must always attend to the nervous disorder in the cure of the primary disease; and frequently, leaving the primary disease to itself, he must endeavour to remedy the nervous complaint: but the nervous symptoms are always cured by such medicines, as the nature of the malady, of which they are the symptoms, requires, and are often removed by medicines otherwise quite contrary to their nature.

To illustrate this by an example I shall take the following instances.

The convulsions originating from worms, or fordes in the *primæ viæ*, are sympathetic nervous disorders, but by no means symptoms, owing to the nature of the diseases themselves. For these nervous complaints chiefly appear, when those disorders take place in children, women, and men of a weak and irritable constitution: whereas, if the fordes of the *primæ viæ*, or worms, attack strong vigorous men, or persons of an indolent constitution, these
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symptoms are totally wanting. An unequivocal sign, that these convulsions are no symptoms of the diseases in question, but ought to be imputed to the irritable constitution of the patients, in which the nervous system readily partakes of the operation of morbid stimuli on the general habit. Thus, though in such cases the nervous system itself, strictly speaking, is not primarily affected, but only suffers by sympathy, yet a certain irritability of the nervous system, and predisposition of it to become morbid, exist. Hence it is, that, in the epilepsy arising from worms, the wild valerian usually proves so beneficial; because it combines together an anthelmintic, and an antispasmodic quality. Nay, though by the use of mere anthelmintics the epilepsy is often remedied; still it is always prudent to prevent its return, by strengthening the nervous system; as, if this precaution be neglected, the convalescent remain very irritable, and very much disposed to epilepsy, or other convulsive disorders from very slight stimuli. The same is to be said of the *fordes* of the *primæ viæ*, when attended with convulsions: as, after clearing the alimentary canal, the digestive organs should be restored to their due tone by tonics. In the tetanus, when brought on either by a wound or a fracture, which of the two is to be attended to, the primary disease, or the nervous system secondarily affected? Is it not proved, beyond all doubt, that the only way of giving the patients at least a chance of recovery is, to attempt to moderate the irregular and excessive motions of the nervous system by a free use of antispasmodics and sedatives?

But the case is quite different in the nervous symptoms. Let us suppose, for instance, that a patient
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should labour under a bilious colic; and that, to remove the nervous symptoms, valerian, opium, asafoetida, castor, and other nervous remedies should be administered: what would be the consequence? At least an augmentation of all the symptoms, and very often an inflammation of the *primæ viæ*, and death itself: whereas rhubarb, crystals of tartar, tamarinds, &c. though possessing no power at all over the nervous system, will effectually remove these symptoms.

When on the subject of fevers I observed, that intermittents, attended with a comatose affection of the head, are sometimes epidemic; and that this comatose affection, when not speedily remedied by proper treatment, terminates in a fatal apoplectic fit.

But by what means is the apoplexy in such cases to be prevented? Do bleeding, a refrigerant regimen, emetics, purgatives, and stimulants, prove useful for this purpose? By no means: on the contrary, a large dose of opium, a medicine otherwise opposite to the nature of the apoplexy, prevents the fit from taking place*.

It would be easy to add many other instances to these: but the scope of this treatise does not permit it; and it is the less necessary, as the above are quite sufficient to show the utility of the distinction.

* Vogel, l. l. theil 1, kapitel 2, p. 53.

O R D E R I.

Atony of the Nervous System.

G E N U S I.

Apoplexy.

APOPLEXY is either a diminution, or an abolition, both of the external and internal senses, and of the voluntary motions, attended with a stertorous breathing, and the appearance of a profound and continual sleep, out of which state the patient cannot be roused by the application of strong stimulants to the organs of sense.

This disease, though it sometimes makes it's appearance in youth, generally attacks persons in an advanced period of life. The predisposing causes are a large head, a short neck, a sanguineous temperament, corpulent habit, and a sedentary inactive life. The occasional are a full diet, suppression of an usual discharge, frequent intoxication, immoderate exercise, the cold bath used when the body is hot, violent passions of the mind, convulsions, compression of the jugular veins, tumours in different parts of the brain and it's membranes, external violence; in a word, whatever either by inciting the circulation of the blood toward the head, or by putting a stop to it's return from that organ, or by any other cause, compresses the brain and origin of the nerves, or, independent of compression, interrupts the

the functions of the nervous system by destroying it's energy.

In far the greater number of cases the apoplexy arises from an overloaded state of the vessels of the brain, which, being distended beyond their tone by some cause or other, suffer a rupture, so that an extravasation of blood takes place upon one of the membranes of the brain, or into the substance of the brain itself, which, by compressing that organ, puts a stop to it's functions. The attack of the disease is more or less violent in the compound ratio of the degree of effusion and the different susceptibility of the brain in different individuals to be affected by pressure. Indeed it is proved beyond all doubt, that the brain will have it's functions impaired in very different degrees in different persons from the same apparent degree of injury. Whether an overloaded state of the vessels of the brain without extravasation may bring on an apoplexy, is a questionable point. That a congestion of blood in the venous vessels of the head may occasion a comatose state, is in my opinion not to be doubted; for in many cases the malady is preceded by a degree of coma, and various other symptoms, which, when not taken off in time by proper treatment, increase daily more and more, and at length terminate in an apoplectic fit. In these cases the disease seems to originate from an accumulation of blood in the head, which in some measure compresses the brain, the symptoms gradually increase, on account of the vessels becoming daily more and more distended, till at length the over distention is such, that the blood-vessels, being incapable of resisting
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any longer, give way to the pressing column of blood, and an extravasation takes place: whereas, if the disease come on suddenly in a considerable degree, the exciting causes operate so violently on the brain as to cause an immediate rupture of it's blood-vessels, on account of their being unable to accommodate themselves to the large quantity of blood transmitted to them in such a sudden and violent way. It seems therefore, that, in cases where the disorder comes on gradually, it originates from an overdistention of the blood-vessels of the brain, ultimately terminating in their rupture: but when the disease comes on very suddenly, an effusion of the blood has taken place directly, in consequence of the violent operation of the noxious stimuli.

Extravasated blood is the most common cause of this disease, as is proved beyond all question, by the numerous dissections of patients, who died of apoplexy, made by the celebrated practitioners John Hunter, and George Fordyce; the latter of whom found extravasated blood in every one of the heads of ninety-eight apoplectic patients, who were opened after death. But though the effusion of blood into the cavity of the skull is doubtless far the most frequent cause of apoplexy, yet, from the observations of Willis, Morgagni, Valsalva, and Lieutaud, there is strong reason to believe, that sometimes an apoplexy may be brought on by an overdistention of the blood-vessels alone, without extravasation. Nay it seems, that without any compression of the brain at all, on certain occasions, an apoplexy may arise: for Rahn and Valisnerius record, that, in many dissections of patients, who were carried off by the disease in question, neither the least extravasation of blood,

nor the slightest alteration of the brain or it's membranes, could be found upon the most accurate inquiry. To account for the cause of apoplexy in such cases is very difficult. In all probability the noxious stimuli, without first operating upon the sanguiferous system, sometimes directly and immediately act on the brain and nerves, and suspend the functions of the nervous system by destroying it's energy; though, on considering the remote causes of the disease, no doubt will remain, but that most of them act by compressing the brain.

The proximate cause of apoplexy seems thus to consist in an interruption of the functions of the nervous system, brought on in consequence either of the brain being compressed, or it's energy destroyed, by some noxious power.

The prognosis of this disease is ominous; for though the patient sometimes entirely recovers from the apoplexy, yet in far the greater number of cases it has either a fatal termination, or ends in hemiplegia. Even when the constitution of the patient has struggled through the disease, there is commonly a strong disposition to a fresh attack, and the repeated paroxysms of the apoplexy in general sooner or later bring on one or other of these events. The danger however is more or less urgent.

1, According to the causes of the disease. For instance, an apoplexy arising from burning charcoal, the fumes of mercury, opium, and other narcotic poisons; and that which originates either from an acute fever, or an epileptic fit, prove almost always mortal,

mortal, when in any considerable degree. Whereas an apoplexy owing to suppressed evacuations affords much more hopes of cure, on account of the operation of the noxious power being less violent, and the patient's strength usually not so much impaired.

2, According to the violence of the symptoms. For, as the causes of the apoplexy are *ceteris paribus* proportionate to the violence of the symptoms, a high degree of apoplexy seldom occurs without a considerable effusion either of blood or serum; and when either of these is extravasated in a large quantity, a complete recovery from the disease is very rare. If therefore a perfect abolition of sense and motion, attended with difficult respiration, take place; if there be a difficulty of swallowing, and the drink return through the nose; if the patient frequently should move his hand to a certain part of the head; if the saliva foam from the mouth; if partial clammy sweats, coldness of the extremities, and a relaxation of the sphincters of the anus and bladder, make their appearances; and if, while one side of the body is affected with loss of sense and motion, the other side become strongly convulsed; a fatal termination of the disease is to be expected. If, on the contrary, the functions of the nervous system have not been quite abolished; if the respiration be pretty easily performed; if hemorrhoids, menses, profuse sweats, a copious saliva, an increased secretion of urine, and, in the serous apoplexy, a fever, appear; especially if with these efforts of nature to get rid of the morbid stimulus a di-

minution of the symptoms take place; hopes of cure may be entertained.

2, The duration of the malady should likewise be taken into the account; for apoplexy is an acute disease, and when not speedily remedied, it usually has a fatal termination. Macbride observes, that there are hopes of perfect recovery, if the functions of the nervous system be in a considerable degree restored within four days; but that, if the disease be little diminished within this period of time, very small hopes remain, and the apoplexy usually ends in death, or in an incurable hemiplegia*.

4, Lastly the age and constitution of the patient should be duly attended to in the prognosis: for persons of an advanced period of life seldom entirely recover; and those who are of a phlegmatic indolent habit, weak pulse, with an universal tendency to dropsy, are mostly carried off by the disease, on account of the general relaxation and debility of the system.

Writers on the practice of physic generally distinguish this disease into two kinds, the sanguineous and the serous apoplexy. If by the latter they wish to express, that persons of an advanced period of life, and of a cold indolent phlegmatic habit, who have either indulged in frequent intoxication, or are weakened by other morbid causes, in consequence of the general debility and relaxation of the system, sometimes contract an universal tendency

* L. l. vol. ii, book vi, chap. i.

to dropsy, a leucophlegmatic habit attended with a greater or less degree of coma; and that this morbid state of the body, when not remedied by proper means, sooner or later terminates in an apoplectic fit, by which the patients are most frequently destroyed, on account of a quantity of serum being effused into the head; I will not cavil about the propriety of the denomination; as it is well known, that an effusion of serum into the cavity of the skull sometimes happens from a hydropic diathesis prevailing in the system; and that a general dropsy not unfrequently terminates in apoplexy. I must only remark, that this apoplexy is not idiopathic but symptomatic, occasioned by the prevailing hydropic or leucophlegmatic diathesis of the system. If, on the contrary, by the term serous apoplexy it is to be understood, that the true idiopathic apoplexy happening to healthy persons is to be distinguished into two kinds, sanguineous and serous, I am very much disposed strongly to deny the existence of such a serous apoplexy, except in books; for I cannot comprehend, how this effusion of serum can take place in a healthy constitution. I have twice had an opportunity of observing the serous apoplexy: but in both cases the health was very much impaired, and there were evident signs of a general debility and relaxation of the system; a leucophlegmatic habit, and an universal tendency to dropsy, previous to the fit. Even if we consult the most eminent practitioners on the subject, it will appear, that they have made this distinction more through deference to custom and the authority of the ancients, than from their own observations. Burserius and Cullen, though they make use of the common dis-

inction of apoplexy into sanguineous and serous, yet observe, that both kinds often depend on a venous plethora, and require very nearly the same method of cure. Morgagni is not only of the same opinion, but also records an instance of a man of an advanced age, who was supposed to have died from a serous apoplexy, in whose head a large quantity of extravasated blood was found*. Quarin goes so far as to say, that a true serous apoplexy seldom takes place; and that in all cases, where the pulse and strength of the patient admit of it, recourse should be had to venesection†. Instead, therefore, of employing the common distinction of this disease into the sanguineous and serous, which certainly cannot be very usefully applied in practice, and gives rise to the general error of the too free and early use of volatile and heating remedies, I shall divide the apoplexy into idiopathic and symptomatic, for the treatment of both which I shall attempt to lay down general rules.

The treatment of apoplexy, whether idiopathic or symptomatic, is to be conducted upon three general indications.

1, The apoplexy should be prevented, if possible.

2, The removal of the existing disease is to be attempted by the most active means, on account of the usual violence and fatality of the complaint.

* L. l. epist. iv, art. 21 & 22,

† L. l. cap. i, p. 5 & 11.

3 , The disposition of apoplexy to return is to be kept off by a suitable regimen.

These indications are accomplished by different remedies, in the different species of the disease, each of which requires therefore to be separately considered.

The idiopathic or sanguineous apoplexy is in many cases preceded by various symptoms, such as frequent fits of giddiness, headache, hemorrhage from the nose, a red, flushed, and bloated countenance, the veins of the head, neck, and under the tongue, turgid, the eyes protuberant and suffused with tears, stridor dentium, tinnitus aurium, some transitory interruptions of seeing and hearing, tremor and numbness of the extremities, torpor of the senses, an impediment of the speech, loss of memory, unusual sleepiness, frequent fits of incubus, frightful dreams, in which every thing appears to the patient red coloured by false vision, the urine is also frequently red, the respiration slow and difficult, and the pulse is slow, full, hard, and generally very strong.

The idiopathic apoplexy should be prevented, in cases where it's attack is immediately threatened, by a copious bleeding from the jugular vein or temporal artery. But when the disease has not advanced so far as to endanger an immediate attack, bleeding is rather to be omitted; for it should always be considered, that venesections, as far as they are compatible with the healthy actions of the digestive organs, and when not carried beyond a certain point, have a tendency to increase the ple-

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thora, of course require frequently to be repeated, and thereby induce such an irritability and debility of the general system, that the vessels cannot afterwards bear even a very slight superabundance of blood; and stimuli, which would have no effect at all upon sound vigorous persons, prove morbid to such individuals. Since a habit like this is not very comfortable, and may be attended with much danger, it is much better to obviate the plethora, by moderate bodily exercise, either by riding on horse-back or walking; by using a regular, abstemious, and somewhat low diet, especially with regard to supper; by abstaining from all strong stimulating liquors, and, unless the patient have long been accustomed to the use of wine and porter, in which cases he may be indulged in a moderate quantity of either, small beer, or mineral waters, should be his common drink.

As evacuations by stool certainly contribute a great deal to relieve the plethoric state of the vessels of the head, costiveness is to be carefully avoided; the body is constantly to be kept regular, or rather open, by gentle laxatives; and upon any appearance of an unusual turgescence, especially in the spring, a brisk purgative of calomel and rhubarb is to be preferred to gentle laxatives, in order to produce more effectually a determination to the bowels, and this should occasionally be repeated in all cases, where there is a strong tendency to apoplexy. The free use of tobacco in any shape is to be avoided, as there are instances on record of persons, who died of apoplexy contracted merely from the abuse of this plant. With these means, which, when used sufficiently early,

early, will generally prove effectual to prevent the disease, the application of some leeches to the temples may be usefully combined, in cases where evident signs of any unusual turgescence of the vessels of the head appear; as the use of these is not attended with the injurious consequences often succeeding to general bleedings.

The next thing to consider is, what ought to be done, when the apoplexy immediately succeeds the application of the exciting causes, so that there is no opportunity for preventing the disease. In all cases of idiopathic apoplexy, recourse is to be had to a free use of the lancet. The quantity of blood to be drawn ought no doubt to differ according to the pulse, strength, and age of the patient; yet a large bleeding proves always useful, and is to be immediately employed, for the sooner the compression of the brain is removed, the more chance there is of recovering. The venesection will be most effectual, when the blood is taken from the jugular vein, or temporal artery; for it is at present clearly ascertained, that, in all affections of the head, bleeding from these vessels affords more relief than a much larger quantity taken from the arm. It is likewise far from a matter of indifference in all cases from which side the blood is drawn: for when one side of the body is more affected with the loss of motion than the other, the venesection should be made on the side opposite to that most affected; since dissections show, that the hemiplegia is always upon the opposite side of the body from that of the brain, in which the effusion of blood has taken place. The opening of the occipital veins

by cupping the back part of the head with deep scarifications, and the application of several leeches on the temples, may be usefully joined with the general venesection.

It is also proper, to attempt to relieve the vessels of the head, by producing a determination to the bowels; which may be immediately done by stimulating the *primæ viæ* by acrid glysters; and, if the patient have any power of swallowing, drastic purgatives should likewise be given by the mouth. Briskly operating purges here justly claim the preference on account of the violence of the complaint. Vomiting has likewise been recommended: but this practice is highly to be reprobated on account of the great violence with which it impels the blood into the vessels of the head. Burserius witnessed several cases, in which a slight hemiplegia changed into a violent apoplexy, and a vehement one terminated fatally within a few hours, on the exhibition of an emetic*.

Another very powerful remedy in removing the apoplexy, to which the practitioner should always have immediate recourse, is blistering. The blisters are usually applied between the shoulders; but they prove much more effectual, when applied to the head itself. Blisters seem to operate partly by making a revulsion, and partly by rousing the vital principle into action by their stimulant power. To make the revulsion more considerable, sinapisms and epispastics may be applied to the lower extre-

* L. l. t. iv, cap. iv, p. 107.

mities at the same time; and pediluvia may likewise be used. Tissot was very averse to the use of blisters in the sanguineous apoplexy, being extremely apprehensive, that they would do harm to the patient by their stimulant power; as he had once observed, in an elderly lady, that an apoplexy, which was in a great measure abated by venesection and purging, terminated fatally on the application of blisters*. But no general rule can be drawn from this solitary instance. It is well known, that blistering, instead of exasperating the complaint, generally has a considerable share in removing it: and there is the less room for apprehension from the stimulating effects of blisters, if they be employed, when I think they may with most advantage, after the vessels of the head have been sufficiently unloaded by a copious bleeding from the jugular vein or temporal artery.

It should be observed, as a general rule, that in all species of apoplexy the patient is to be kept as much as possible in an erect posture, and in cool air; the patient's chamber therefore should be kept very cool; persons who are disposed to apoplexy, or have laboured under this complaint, ought likewise always to live in a cool air, and to sleep in a somewhat upright posture, with the head elevated, in order to prevent the accumulation of blood in the vessels of the brain.

Some practitioners, together with the remedies already mentioned, recommend the use of stimu-

* *Epist. var Argument. ad Haller, p. 65.*

lants of various kinds; but sound reasoning alone is sufficient to prove, that, wherever the apoplexy depends upon a plethoric state of the vessels of the head, as is invariably the case in the idiopathic apoplexy, such remedies must be very improper. This is fully confirmed by experience; since Cullen, Quarin, Morgagni, Burserius, and other celebrated practitioners, all agree, that the use of stimulants is highly to be reprobated, and such remedies usually do a great deal of mischief. After the patient returns to his senses, the body should be kept open by neutral salts, and cooling and acescent purgatives.

The return of the apoplexy is to be obviated by having recourse to the remedies we have recommended for it's prevention; but, on account of the strong tendency patients, who have once laboured under the disease, generally have to a relapse, in addition to the above means setons or issues, producing a discharge of pus from the neighbourhood of the head, may be very usefully employed in obviating the plethoric state of the vessels of the head. Besides, as plethora is not only compatible with a certain degree of weakness and irritability of the system, but also not unfrequently originates from general debility; it is evident, that in many cases a moderate use of tonics, and a nourishing diet, may prove efficacious in preventing the apoplexy, and that every thing, that has a tendency to induce a debility of the general habit ought carefully to be avoided.

The symptomatic apoplexy may arise from different causes, to the nature of which the treatment
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is to be suited. If it arise from a hydropic diathesis of the system, that is, if a serous apoplexy take place, the disease is always preceded by a morbid state of the body, and by various symptoms, such as unusual heaviness, head-ache, vertigo, some faltering of the tongue in speaking, coldness of the extremities, loss of memory, torpor of the senses, a countenance pale and bloated, or of an erysipelatous redness, and soft to the touch, swollen and watery eyes, difficult respiration, false vision and hearing, frightful dreams, in which the patients fancy themselves suffocated by water or snow, a leucophlegmatic habit, a weak slow pulse, and an universal tendency to dropsy. Indeed this apoplexy is so strongly marked by the symptoms mentioned, that a practitioner can never be at a loss to know when it's approach is to be apprehended.

It is a happy circumstance, that the serous apoplexy may be foreseen a long time before it's attack, as thus we are enabled to attempt it's prevention by proper means; for if the serous apoplexy be produced, the disease has almost invariably a fatal termination, and the patient is not unfrequently so soon destroyed, that there is no opportunity left for trying any remedy. Even though the physician is called in sufficiently early before the attack, he will often find it a matter of great difficulty, to prevent the apoplectic fit from taking place, on account of the debility and relaxation of the general habit, which are constant attendants of this species of apoplexy; and most frequently the disease proves obstinate to all remedies, and ends sooner or later in death, or in hemiplegia.

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For the prevention and cure of the serous apoplexy, some writers recommend the application of leeches, or bleeding by cupping glaffes. With what view remedies of this kind are to be used is difficult to say; for in these cases there is rather a want of blood, than a superabundance; and such remedies certainly cannot have the least influence either in preventing an effusion of serum into the substance of the brain, or curing it when existing. Most practitioners are very fond of active emetics, and drastic purgatives, with intent to expel the serous humour from the body. Indeed the evacuating plan forms the chief part of the common practice in this disease. As, however, the serous apoplexy originates from a considerable degree of debility and relaxation of the general habit, and the frequent repetition of powerful emetics and brisk purges must doubtless have a strong tendency to weaken the body a great deal more, the propriety of such a practice may justly be doubted; the more, as the common method proves very generally unsuccessful, the patient becomes more and more weakened, the symptoms daily increase, and death for the most part closes the scene.

In this species of apoplexy, therefore, after cleansing the *primæ viæ* by an active emetic and a brisk purge; though no doubt the alimentary canal is always to be kept clean by the occasional exhibition of calomel and rhubarb; the chief treatment should consist in rousing into action the system at large, and the absorbents in particular, by putting the patient upon the stimulating plan. A large blister is to be applied to the head; stimulating the lower extremities by epispastics, sinapisms, and blisters themselves,

themselves, is advisable; and a blister may likewise be put between the shoulders. Internally, recourse should be had to musk, valerian, asafoetida, camphor, ammonia, leopard's bane, bark, snake-root, wine, and the whole tribe of stimulants, in order to remove the cause of the disease by strengthening the general habit. As, on account of the weakness of the stomach and bowels, the patients in general will not bear these remedies in substance, they are to be given in decoction, infusion, or mixture. This treatment, it is true, is not yet sanctioned by experience; but, as the common method of practice so generally fails, I am, I trust, perfectly justified in recommending another, which, being founded on the nature of the disease, gives at least hopes of success.

After recovery, the return of the serous apoplexy is most effectually prevented by restoring the system to it's due tone, by bark, bitters, steel, chalybeate waters, moderate exercise, and a nourishing diet.

When on the subject of fevers we mentioned a kind of intermittents, that were very dangerous on account of their being attended with a comatose state, which, when not speedily remedied, usually ended in a fatal apoplectic fit. To prevent this unhappy termination, a large dose of *laud. liq. Sydenh.*, or *tinctura opii*, given during the attack, proves very useful. It is very probable, that a blister, applied to the head a short time before the accession of the cold fit, would likewise powerfully counteract this tendency to apoplexy, by taking off the spasmodic disposition of the vessels of the head, which seems to occasion the accumulation of
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blood in this organ. Glysters with tincture of opium and asafoetida should likewise be tried in these cases. Lastly, in the interval between the paroxysms, the return of the fit is to be prevented by giving large doses of bark.

If the apoplexy be brought on by external violence, a large quantity of blood is to be taken from the jugular vein or temporal artery, and the bowels of the patient are to be cleared by glysters, and purges given by the mouth. If the symptoms of compression of the brain should not give way to this treatment, recourse is immediately to be had to the operation of trepaning, as here waiting is attended with much danger. The trephine should likewise directly be applied, if any depression of the bones of the skull take place, though the symptoms of compression of the brain do not make their appearance; since experience has proved, that these often do not come on till several days after the injury; and that, to delay the operation till the symptoms of compression arrive, frequently proves fatal to the patient.

If the apoplexy be the consequence of the taking of narcotic poison, or the inhaling of carbonic acid gas; the remedies above recommended to counteract their poisonous effects on the constitution, are to be employed. But, as dissections of such bodies have shown, that in these cases the blood is always accumulated in a considerable quantity in the vessels of the head, and most frequently even an extravasation of blood into the substance

substance of the brain takes place*, in addition to those means bleeding freely from the temporal artery or jugular vein will always be advisable, in order effectually to relieve the plethoric state of the vessels of the head.

When the apoplexy is produced by a translation of the gout or rheumatism to the head, if the patient be plethoric, and the pulse full, hard and strong, venesection and the antiphlogistic treatment are to be put in practice. If, on the contrary, the pulse be soft and weak, and the constitution of the patient broken down by the previous disease, blisters applied both to the head and lower extremities, and musk, camphor, ammonia, and asafoetida given internally, are the most likely means of relieving the patient. Our resources however are very precarious in these cases, and the situation of the patient is always dangerous in the extreme; for most frequently death arrives within a few hours.

With regard to the manner, in which life is destroyed in this disease, the patient is not unfrequently cut off at once by the violence of the attack. Often, however, the noxious stimuli do not act with such force as to kill immediately, but only induce an apoplectic state, which may be protracted for some time. In this case the apoplexy is often attended with convulsive motions owing to the vain efforts nature makes to relieve herself; but all the assistance the physician can give being insufficient

* Portal, *Hist. de l'Acad. des Sciences*, ann. 1775.

to enable her to get rid of the noxious stimulus, the patient sinks under the complaint, and death closes the scene.

When the apoplexy does not terminate fatally, the disease seldom admits a complete recovery, but ends in hemiplegia: and as palsy, though it may arise from many other causes, is frequently the consequence of an apoplectic fit, it will not be amiss to introduce the subject here.

GENUS II.

Palsy.

PALSY is the total loss or diminution of motion, or of sensation, or of both, in one or more parts of the body. The disorder has different names according to the parts affected. One of its most frequent forms is when it affects the whole of the muscles on one side of the body, and is called hemiplegia.

It is somewhat difficult to render an account, why in one case the feeling of the part only is affected; while in another the power of motion is destroyed; and in a third both sensation and motion are quite lost. Some physiologists, in order to explain it, have supposed, that there exist two sets of nerves, one for motion and another for sensation. But this hypothesis may easily be refuted on anatomical grounds.

grounds. The dissection of every body will teach us, that the same nerves preside over both motion and sensation; and when the nerves going to the extremities are tied, or cut, both the sensation and motion of the parts are lost. It seems, therefore, more reasonable to suppose, that the same nerves serve both for sensation and motion, but that according to the different manner of operating of the noxious stimuli, either sensation, or motion, or both are lost. In both the former cases an incomplete, and in the last a complete palsy takes place.

The remote causes of palsy are whatever may put a stop either to the functions of the nervous system in general, or to the nerves of the affected part in particular, by pressure; or may destroy their action, by it's violent operation.

The proximate cause of palsy is the partial or complete interruption of the function of the nerves in the affected part, in consequence either of pressure, or injury to their structure.

The prognosis is always very doubtful in this disease. The degree of the malady, it's duration, it's cause, the parts affected, and the constitution and age of the patient, should all be taken into consideration. It is usually only the slighter degrees of palsy, and where the disorder exists in it's incomplete form, in which we may entertain hopes of a radical cure. Recent cases, *ceteris paribus*, yield more readily to the power of physic, than those of a long standing; a palsy originating from apoplexy most frequently terminates in a fatal

apoplectic fit. The disorder is seldom cured when depending on pressure of the spine, or when it comes on in consequence of any external injury of the head. The paralytic affections of the parts near the head, and of the upper extremities, are in general more difficultly removed, than those of the lower extremities: the reason of which seems to be, that the nerves of those parts, being of a more delicate structure, may be more violently affected by the morbid stimuli; and that, the tone of delicate organs being once destroyed, it is less easily restored than in those of a more firm texture.

The cure of palsy is to be founded on general principles. If the disease succeed to the idiopathic apoplexy, the pulse be full and strong, and the patient of a plethoric habit, the same treatment, as recommended for the apoplexy, will likewise here be useful. If, on the contrary, the disease have subsisted for some time, and a loss of appetite, emaciation, and debility of the general habit, accompany it, the tonic plan, bitters, bark, steel, and the cold bath, are to be employed. In palsies brought on by narcotic powers, the warm bath has often been of service. When no cause appears, and the patient is of a cold, indolent, phlegmatic temperament, asafoetida, the extract of the *rhus radicans*, ammonia, arnica, mustard-whey, guaiacum, tinctura cantharidis, flores lavendulæ, camphor, and the whole tribe of stimulants, should be tried. Vomits also have sometimes been useful; and recourse may be had to electricity, applied with a moderate force, with advantage. Blisters, epispastics, volatile liniment, camphor, Barbadoes tar, oil

oil of turpentine, spir. vini, or ung. citrinum, are externally to be applied at the same time. The diet of the patient should be nourishing, and all sexual intercourse is to be prohibited. Indeed venery alone is capable of counteracting all our endeavours to cure the disease, on account of the violent shock it gives to the constitution, and the strong tendency it's frequent repetition has to weaken the nervous power. But though by the remedies here mentioned, when properly adapted to the patient's constitution and the cause of the disease, the palsy may be happily remedied in many instances, we are not acquainted with any practice, that certainly or even generally proves successful; and frequently, after having tried the whole class of stimulants, both internally and externally, the physician will have the mortification to leave his patient in the same condition in which he found him.

ORDER II.

Spasm.

SPASM is a violent and involuntary action of the muscles. This is named tonic spasm, if the muscles remain contracted, and the affected parts be immoveable: but if the contractions continually alternate with relaxation, it is called clonic spasm. From each of these kinds I shall select one species.

G E N U S I.

Tonic Nervous Diseases.

S P E C I E S I.

Tetanus.

TETANUS is a fixed, involuntary, and painful contraction of almost every muscle of the body.

In some cases, where the body is drawn forwards, this disease is called *emprosthotonos*; when, on the contrary, the body is bent backwards, the disorder is named *opisthotonos*; when particularly affecting the muscles subservient to the motion of the jaw, and those about the neck, the disease is called the locked jaw, or *trismus*. But all these are only different forms of one and the same disease, and require the same treatment.

Though the disease affects all ages, sexes, temperaments, and complexions, yet it more frequently attacks children and persons of a middle age, the male sex more than the female, and robust and vigorous men more than the weaker. The malady may occur from certain causes in every climate: it particularly prevails however in the warmest climates, during the rainy seasons. The exciting causes are sudden vicissitudes of heat and cold; cold and moisture applied to the body, while it is very warm; sleeping in the open air, especially in a damp place;

place; wounds, luxations, fractures, punctures, or laceration either of a nerve or a tendon; fordes of the *primæ viæ*, worms, &c.

The proximate cause of tetanus seems to be a certain and determinate disturbance of the functions of the nervous system; though wherein this consists, or what predisposition of the body is requisite, in order that the exciting causes may produce the disease, we are hitherto quite ignorant. A tender and irritable constitution predisposes in general to nervous diseases; but the predisposition to the complaint in question cannot possibly be imputed to the natural tenderness and irritability of the constitution; for it is a common observation, that robust and vigorous men are more liable to the disorder than delicate females. Mr. Heurteloup, a french surgeon, supposes indeed the proximate cause of tetanus to be a relaxation of the solids*: yet the remote causes of the disease, and the constitutions chiefly attacked by it, clearly show, that this author is mistaken, and that he has confounded the cause of the malady with it's effects, which are always a relaxation and debility of the solids.

As we are thus unacquainted with the predisposing causes of the disease, I cannot enter upon the pathology of the complaint. For the same reason no general rules of practice, founded upon the nature of the disease, can be laid down; but I must be satisfied with communicating what experience has taught with respect to the prognosis and

* *Precis sur le Tetanos des Adultes*, Paris, p. 12.

treatment of tetanus, after having first given the history of the disease.

Symptoms + The disorder sometimes comes on suddenly to a violent degree; but more frequently, especially in our temperate climate, it approaches by slow gradations to it's violent state. In these cases the course of the disease is generally the following. First, there is a sense of stiffness and rigidity in the back part of the neck, which, gradually increasing, renders the motions of the head difficult and painful: then an uneasy sensation about the root of the tongue, and a difficulty of swallowing; a violent pain at the lower end of the sternum, thence shooting into the back; the muscles subservient to the motion of the lower jaw become affected with a violent spasm, and shut the teeth so closely together, as not to admit even of the smallest opening; a greater number of muscles gradually partake of the spasmodic affection; the trunk of the body is sometimes bent strongly backwards; in other cases, but more seldom, it is drawn violently forwards; the muscles of the lower extremities being affected with spasms, keep the limbs rigidly extended; during the whole course of the disease the abdominal muscles are so violently affected with spasm, that the belly is strongly retracted, and feels hard as a piece of stiff leather. Though in the very commencement of the disease all the muscles partake more or less of the spasmodic contraction; yet at first the extensors are usually the parts most strongly affected; but in the more advanced stages of the complaint the flexors become affected with equal violence. Hence the head and trunk grow rigid,
inflex-

inflexible, and admit not of the least motion any way. The upper extremities, little affected before, are now likewise rigidly extended. These spasms are every where attended with acute pains. The utmost violence of spasm subsists however only for a minute or two, and is succeeded by some remission both of the contraction of the muscles and of the pain: but from time to time the violent contractions and pains are renewed, sometimes every ten or fifteen minutes. During the violence of the spasm, the pulse is hurried and irregular, and the respiration quick and difficult; but the spasm remitting, in most cases the pulse and respiration return to their natural state. At the height of the disease not only all the muscles serving to the voluntary motions, but likewise those of the vital and natural functions, are more or less affected. The spasms now become so frequent and violent, that scarcely any remission can be observed: the heart beats with such force, that it's motions are often perspicuous even through the clothes: the evacuations, both by stool and urine, are in a great measure suppressed: the face is frequently pale, with a cold sweat over the whole body; though sometimes, on the contrary, the face is flushed, attended with profuse warm sweats; a delirium sometimes comes on; nay, from the repeated shocks given to the constitution by the violent spasms, every function of the body is greatly disordered: the muscles of the face partake of the general affection; the forehead becomes wrinkled; the eyes are usually fixed and immoveable; the cheeks are drawn backwards towards the ears, and the whole countenance

expresses the most violent grin. At length a severe convulsive fit carries off the patient.

The prognosis of tetanus is always ominous: since, though recovery from the disease sometimes happens, in general it has a fatal termination. The disorder however is more or less dangerous :

1, According to it's cause. For when arising from cold or worms, it is generally more easily to be remedied, than when proceeding from injuries of the nerves or tendons.

2, When the disease comes on gradually, and is slow in it's progress, much greater hopes of cure may be entertained, than when the malady comes on suddenly to a violent degree.

3, The age of the patient, and the parts affected, are likewise to be taken into the account, as the trismus nascentium, as it is called, almost invariably proves fatal; and when the tetanus particularly affects the thorax, it is very dangerous, because the function of respiration is then not to be performed without the greatest difficulty*.

4, The duration of the disease is to be considered. If it come on suddenly, the patient frequently dies within forty-eight hours: when the malady has passed beyond the fourth day, it is generally less dangerous; though the disorder, after being considerably abated, not unfrequently returns with it's former violence, and ultimately destroys the patient, even many days after the fourth.

* Heurteloup, l. l. p. 21.

From the great danger attending the disease, when it has arrived at it's violent state, it will readily appear, that our care and attention should be chiefly directed to watch the complaint on it's first appearance. Indeed where the malady gradually approaches to it's height, the disorder may very frequently be stopped in the commencement, by evacuating the *primæ viæ* with calomel and rhubarb, and by a free use of opium: but the patient should abstain from wine, and all other strong liquors, as they are highly injurious. When the disease has made considerable progress, and the tetanus is come on; if the malady arise from a puncture or laceration of a nerve or tendon, the wound should be enlarged, in order to remove all tension existing there. If the *primæ viæ* be filled with fordes, the first step to be taken towards the cure is effectually to clear the alimentary canal from it's contents by a glyster; after which we ought to attempt to remove the morbid irritability of the nervous system by every possible means; since the usual violence and fatality of the complaint do not admit of an inquiry into it's cause. The remedies, which have answered this purpose, at least in some cases, are the following.

1, Opium, given in large doses, or in moderate ones frequently repeated. Theden, surgeon-general to the army of the late king of Prussia, records several cases of tetanus, in which opium has been given with success*. Home has seen tetanus quickly give way to the use of opium, after all other reme-

* *Neue Bemerkungen und Erfahrungen zur Bereicherung der Wundarzneykunst, Erster theil, seite 149.*

dies had been tried in vain *. Parr cured an opisthotonos by exhibiting more than twenty grains of opium within the space of twenty-four hours †. Huck, Winslow, Hilary and others, likewise found opium very useful in this disease ‡. And probably opium would have been equally successful in many other cases, if it had not been too sparingly employed from the timidity of practitioners. There is the less reason for being sparing in the exhibition of it; since experience has proved beyond all doubt, that in tetanus opium does not produce coma, intoxication, or delirium, which it frequently does in other diseases, when much smaller quantities have been given. This remedy therefore should be immediately and largely administered upon the first approach of the disease, in order to bring a sufficient quantity of it into the system before deglutition becomes difficult; and though the quantity of opium to be taken ought doubtless to differ considerably according to the circumstances, yet it is by no means uncommon, to give a drachm of opium in the course of twenty-four hours. Indeed I have myself seen two patients recovered by large doses of opium given at short intervals: though it is to be observed, that blisters were used at the same time.

2, Large doses of bark and wine. These have been very successfully employed by Dr. Rush of Philadelphia against this disease. The celebrated physician Plenck likewise has lately proved by

* *Principia Medicinæ*, sect. vi.

† *Med. Obs. and Inq.* vol. iv, art. vii, p. 98.

‡ Burserius, l. l. vol. i, cap. viii, p. 238.

several cases, that bark is a powerful remedy against the tetanus; especially when the patients are either of a weak constitution, or the disease arises from gangrenous wounds, or after amputations; in a word, in all cases, where the malady originates from general debility. Nay this author goes so far as to assert, that in the above cases the bark surpasses even opium in efficacy; as some had been cured by opium given only to three grains a day, in conjunction with the bark; while others, though taking opium alone as far as twelve grains in the same space of time, were carried off*.

3, Mercury. This has lately been employed with success. It is generally administered by unction, so as speedily to bring on salivation. Mr. Heurteloup has frequently seen the complaint speedily yield to mercurial frictions, without any internal remedy being exhibited at the same time †. Plenck also mentions two cases, in which the disease was happily removed by mercurial unction, after both the opium and bark had been given in vain ‡.

Both the warm and cold bath have occasionally been employed with advantage in this disease, especially in conjunction with one or more of the medicines above recommended. I think, however, that in all cases, where the disease does not originate from debility, the warm bath, applied of such a temperature as to relax the body, is the most useful.

* *Act. Acad. Cæsar. Reg. Joseph. med. chirurg. Vindobonens.* T. i, p. 63 & seq.

† L. l. p. 32.

‡ L. l. p. 53.

Blisters are usually reckoned injurious. But, I believe, this is owing to mere prejudice. In the only two cases of tetanus I have seen, in which the patients did well, blistering had a considerable share in the recovery; and I have no doubt, but blisters may be employed in this disease with great advantage.

When deglutition is impeded, bark and opium should be thrown up by glysters.

But though tetanus is sometimes cured by the above remedies, it must nevertheless be acknowledged, that, whatever plan has been pursued, the disease, in most cases, has proved fatal. I would therefore advise the practitioner, when, after the free exhibition of opium and bark, and the use of mercurial frictions, blisters, and tepid bathing, the disease does not seem to give way, instead of persisting in the use of them, to have recourse to other remedies. Belladonna, cicuta, extractum saturni, and the different preparations of arsenic, seem particularly to claim a trial; since the antispasmodic power of these remedies in curing other nervous diseases are beyond all doubt. At any rate, when the usual remedies have been tried in vain, it is better to give the patient at least a chance of saving his life by trying a new remedy, than to let him die without attempting any thing for his relief.

Tetanus does not require venesection. The blood drawn is always of a looser texture; and bleeding has been usually found hurtful. There are, however, exceptions to this general rule, for the malady sometimes originates from causes, which require a strenuous

ous antiphlogistic treatment. Burserius records, that tetanus proceeding from an inflammation of the stomach was happily removed by repeated bleedings*; and Dr. John Innes cured the hydrophobia succeeding to a gastritis by copious venesections, so that a hundred and sixteen ounces of blood were taken from the patient in the course of seven days†. Likewise in order to prevent tetanus from a punctured wound, in young, vigorous, plethoric persons, especially if febrile symptoms be present, the antiphlogistic treatment should be pursued.

With regard to the manner of dying in this disease; the patients are destroyed by the extinction of the vital principle, occasioned by the violent repeated shocks the constitution undergoes in consequence of the continual efforts nature is making to get rid of the morbid stimulus. Hence, if a recovery take place, the convalescent remain weak and feeble for some time; and bitters, bark, wine, and a nourishing diet, are requisite to restore the general habit to it's due tone.

I silently pass over the hydrophobia primaria, and the catalepsy; since these complaints differ from tetanus only in degree, and require nearly the same treatment. The catalepsy, however, being of the chronic kind of nervous diseases, does not stand in need of such an active practice, to diminish the morbid irritability of the nervous system, but is to be remedied by the removal of it's cause.

* L. l. vol. iii, § 277.

† *Med. Essays and Obs.* vol. i, art. 29, p. 227.

G E N U S II.

Clonic Nervous Diseases.

S P E C I E S I.

Epilepsy.

THE epilepsy is an abolition both of the external and internal senses, attended with violent convulsive motions of the whole body.

The disease is of a chronic nature, and often lasts for many years without proving fatal. It comes by fits, which often attack persons seemingly in perfect health, and return periodically, though not always at regular intervals.

The paroxysm is frequently preceded by various symptoms, such as lassitude, stupor, head-ache, vertigo, tinnitus aurium, frightful dreams, palpitation of the heart, a flushed or pale countenance, and the voiding of a large quantity of pale urine. Often, however, a short vertigo is the only symptom that precedes the fit: and sometimes the attack comes on suddenly without any warning.

On the coming of the paroxysm the patient suddenly loses all sense and power of motion, and falls immediately to the ground. He is agitated with violent convulsions, moving the limbs and trunk
of

of the body in various directions; a contortion of the eyes and countenance, and contraction of the fingers, are observed; a frothy moisture issues from the mouth; the tongue is often affected and thrust out of the mouth, and as the affected muscles of the lower jaw shut the teeth with violence at the same time, the tongue is often severely wounded; the semen, urine, and fæces are sometimes discharged involuntarily; the pulse and respiration are hurried and irregular; the convulsions have some momentary remissions, but are suddenly renewed with their former violence; after a time they cease altogether, and are generally succeeded by a state of insensibility, and appearance of a profound sleep. On the remission of the symptoms, the patient recovers gradually his senses and power of motion; but there usually for some time remain behind head-ache, lassitude, and torpor of the whole body.

The remote causes of epilepsy may be considered as predisponent, or exciting.

The predisposition consists in an irritability and mobility of the brain and nerves, owing to an original conformation of the solids, in consequence of which such persons are violently afflicted by stimuli, that have little or no effect on others. This predisposition to nervous diseases is sometimes hereditary. Since a tender and irritable complexion disposes to nervous disorders, it may readily be understood, why men of an irritable fibre, delicate females, and children, labour under nervous diseases more than other persons; and why, *ceteris paribus*,

ribus, those of a sanguine temperament are more inclined to these diseases than others; because the character of every stimulus is easily impressed on their irritable solids.

The occasional causes operate in two ways. They either excite irregular and immoderate motions by irritating the brain and nerves, and thus bring on indirect debility; or they disturb the energy of the nervous system by weakening the whole body. From either of these causes, the vital powers, endeavouring to restore the disturbed equilibrium, run into irregular and convulsive motions. External injuries of the head, extuberances of the bones, ossifications, and various tumours within the cavity of the skull, translation of a disease, suppressed evacuations, repelled cutaneous eruptions, plethora, and the exciting passions of the mind, belong to the former. Sordes of the *primæ viæ*, worms, a morbid state either of the womb, or of the abdominal viscera, especially of the liver and spleen, copious hemorrhages, fear, horror, intense study, frequent intoxication, and narcotic poisons, are the chief among the latter. For the rest, the most robust person may contract such a predisposition to convulsive disorders on various occasions; while the predisposed to nervous diseases in many cases remain free from them during their whole lives, by adhering to a proper diet and manner of living. Lastly, it is to be remarked, that the predisposing causes of the clonic nervous diseases sometimes operate as exciting causes; and that, on the contrary, the predispotion itself to the epilepsy

epilepsy is often brought on by the occasional causes.

But, though the remote causes of the epilepsy are extremely different from each other, the proximate cause of this disease is always the same, consisting in a determinate degree of disturbance of the functions of the nervous system, seemingly owing to it's direct or indirect debility combined with a morbid irritability. For all the occasional causes, though in other respects quite different, agree in this, that they operate by inducing the system into an apparent or real debility; and thus, by disturbing the functions of the brain and nerves, throw the body into violent convulsive motions. No doubt a determinate degree of disturbance of the brain is requisite to the epilepsy: this degree, however, cannot possibly be determined; for it differs according to the difference of constitutions, and of circumstances; so that the same degree of excitement or collapse will bring on in one an epilepsy, in another St. Vitus's dance, and in a third no disorder at all. But though we are ignorant as to the degree of disturbance of the nervous system, requisite to produce an epilepsy, yet an accurate knowledge of it's predisposing and exciting causes is sufficient to lay down general rules with respect to the prognosis and treatment of the disease, to which I now proceed.

The epilepsy is, in general, difficult to be removed, and often bids defiance to all remedies. Attention should be paid to the following circumstances in it's prognosis.

1, It's different species. For the idiopathic is much more obstinate than the sympathetic, and is often incurable: namely, when the disease derives it's origin either from different extuberances of the bones of the skull, from various tumours, or from any organic defect of the brain. Hence the ancients were accustomed to say, that the epilepsy is easily cured, when arising either from the hands or the feet; that the cure proves difficult, if the disease begin from the head; that if tinnitus aurium, vertigo, and a sensatio formicationis in the affected part, precede the paroxysm, hope of recovery yet remains; but that, when the epilepsy attacks without the least previous warning, it is almost always incurable*.

2, The cause of the disease. Thus for instance, an epilepsy arising from anasarca usually destroys the patient, because it is attended with great debility of the body, to which for the most part a watery collection in the skull itself is added. The epilepsy, which succeeds either to phrensy, or madness, is seldom to be cured; as it appears from the dissections of such bodies, that this disease is almost always produced by some fault in the organical structure of the brain†: whereas the epilepsy, which originates from a morbid state either of the stomach, or some other of the abdominal viscera, is often readily cured; and the epilepsy occasioned by dentition is the easiest remedied of all.

* Van Swieten, l. l. vol. iii, § 1058, p. 433.

† Burserius, l. l. t. iii, cap. viii, § 270.

3. The age. As the epilepsy is difficult to be removed in persons of an advanced age; and when it attacks new born children, it mostly proves mortal. But it is by no means rare for the epilepsy of youth to vanish spontaneously at the age of puberty: which has been observed even by Hippocrates: for he says, that “ They, who are attacked
 “ with the epilepsy before the period of puberty,
 “ are cured by the change of the body itself; but
 “ the disease mostly accompanies till death those,
 “ who are afflicted with it after the age of twenty-
 “ five *.” Though it is to be remarked, that this assertion of Hippocrates, respecting the spontaneous removal of the epilepsy at the time of puberty, is only true, either when, the material cause being removed, the convulsive disposition still remains impressed on the nervous system from habit alone, or when the material cause is of such a nature, that it may be removed by the change itself, which the constitution undergoes at that time. For this reason Dr. Quarin is of opinion, that the assertion of Hippocrates chiefly holds good with regard to the plethoric †; at least the disease is far from always disappearing at the age of puberty; and when the disorder is not remedied at that period, it mostly proves incurable.

4. The symptoms of the disease. The more violent and frequent the paroxysms of the epilepsy, the less easily is it removeable: because then there is not sufficient time to remove the morbid cause

* *Aphorif. sect. v, aph. vii.*

† *L. l. cap. i, p. 20.*

during the intermission, and a fatal apoplexy not unfrequently succeeds to a violent epileptic fit. If, therefore, the patient do not come to himself within a few hours; if after the paroxysm the sight be lost for some time; if the semen, urine, and fæces, be discharged involuntarily in the paroxysm; and especially if the convulsions return at intervals; these are bad symptoms.

5, The duration of the complaint. For a recent epilepsy, though frequently returning, is much more easily cured, than an inveterate one. Hence the father of physic notes, that the epilepsy is no longer curable, when inveterate*. And this is not to be wondered at, because the sympathetic epilepsy is not only changed into an idiopathic one by the hand of time, so that a convulsive disposition is communicated to the nervous system by the frequently repeated convulsions; but besides, the idiopathy, when long continued, is afterwards for the most part not to be removed because the disease is then kept up by an alteration in the organic structure of the sensorium, brought on by the repeated fits, from which source also is to be explained, why those, who have laboured for a long time under the epilepsy or other convulsive fits, often become foolish, and acquire an idiotic countenance.

The indications of cure in the epilepsy are twofold. In the paroxysm, the violence of the convulsive motions is to be moderated. This is done by bleeding from the jugular vein, or from the temporal artery, provided there be symptoms in-

* *De Morbo sacro*, vol. xiii, p. 15.

dicating local congestion in the head; by applying blisters to the lower extremities, in order to relieve the head; by anodyne and antispasmodic glysters of opium, valerian, and asafoetida; by stimulating the nose with volatile remedies, and by rubbing liniments of the same kind along the spine; and by preventing the tongue from being hurt by inserting a piece of wood between the jaws. In the intermission between the paroxysm, the cause of the disease is to be removed, and the morbid irritability of the nervous system is to be checked.

After an accurate inquiry into the causes of the disease, the first indication is answered by various remedies, suited to the different exciting causes. Thus, if the disease originate from the aura epileptica, or a *sensatio formicationis* moving from some part of the body upwards to the head, we should attempt to remedy the morbid state of the part by blistering or by making an issue upon it; and if the sensation follow the course of some nerve, this should be divided, and thus the communication of the part affected with the sensorium commune destroyed. If the epilepsy be produced by passions of the mind, and the body be seemingly healthy, opium, and the extracts of belladonna and hyosciamus, are to be administered. If suppressed evacuations occasion the disease, these are to be restored. If the malady be brought on by repelled cutaneous eruptions, as is not unfrequently the case, antimonials, the woody nightshade, warm baths, blisters, &c., are efficacious; and setons in the neighbourhood of the head are found to be of the utmost utility. This cause is always to be attended to in children attacked by the epilepsy; especially, if the attack

begin with a *senfatio formicationis* and a short giddiness; because children are often attacked with an epilepsy, occasioned by the serous defluxions on the head being imprudently dried up. I once observed an epilepsy accompanied by the above symptoms, which arose from a repelled scald head; and several instances are recorded by Quarin*. If the epilepsy arise from irritation of the *primæ viæ*, emetics and purgatives effect a cure; and, by the way, the clearing of the alimentary canal should in all cases be our first step toward the cure of the disease. If it be owing to plethora, a copious bleeding, an antiphlogistic regimen, mild purgatives, and a low and abstemious diet, prove beneficial. If varicous disorders of the abdominal viscera (obstructions) constitute the cause of the epilepsy, aperients, especially of the hot stimulating kind, are to be administered, the use of which is duly to be persisted in; as they are likewise nervous remedies. The commonly called obstructions of the glands require those medicines, which I mentioned when treating of the scrofula. If the epilepsy be brought on by the debility, and relaxation of the solids, as is very frequently the case; the bark, preparations of iron, cold bathing, frictions, and moderate exercise accomplish a cure. Cold bathing particularly is of the greatest use in the cure of nervous diseases; and from what I have seen, I am perfectly satisfied, that it has a considerable share in remedying these complaints. The epilepsy returning at fixed and determinate intervals often yields to the bark with the wild valerian. If this disease be produced by a hysteric affection, recourse ought to be had to the ferulaceous gums, especially asa-

* L. l. p. 19.

foetida, and the other antihysterics. Lastly, anthelmintics perform the cure, in the epilepsy arising from worms. The cause of the epilepsy is however sometimes not to be discovered; and this disorder is not unfrequently kept up by such causes as brave all remedies.

If, though the material cause of the epilepsy be removed, the disease should still continue, on account of a convulsive disposition impressed on the brain and nerves; and thus the complaint should become merely habitual: or if no material cause be discoverable, as is the case in the idiopathic epilepsy: the physician is to attempt to remove this convulsive disposition of the nervous system, by diminishing the morbid irritability of the brain and nerves; which may be done in two ways.

1, By medicines checking the too great irritability of the nervous system by their antispasmodic, and sedative power. Opium, hemlock, deadly nightshade, black henbane, mercury, and factitious cinnabar, belong to these; Morgagni, Greding, Stoll, Cullen, Burserius, Murray, Gmelin, Donald Monro, and A. Monro, having proved by many instances the efficacy of those medicines in the habitual epilepsy*.

* Morgagni, l. l. art. vi, & vii: Ludwig, *Advers. med. pract.*, vol. i, pt. iv, p. 637, & seq.: Stoll, l. l. pt. 3, sect. v, p. 278; Cullen, l. l. § 1338 and 1342: Burserius, l. l. vol. 3, cap. viii, § 284 & 286: Murray, l. l. vol. i, ord. vi, p. 243 & 244: Gmelin, *Apparat. Med.* pt. ii, vol. ii, p. 53, & seq.: Donald Monro, *Essays and Obs. Phys. and Liter.* vol. 3, art. 30: and A. Monro, *ibid.* art. 31.

It will seem paradoxical, perhaps, for me to class mercury among the remedies acting by an antispasmodic and sedative virtue, since this remedy is in general looked upon as one of the most powerful stimulants we possess; and it doubtless quickens the circulation, and gives the blood a buffy coat; but it ought to be remarked, that the same effects are observed from opium; that all sedative remedies, previous to their lowering the system, operate as stimulants; and that the difference between them and the true stimulants is, that the torpor succeeding to their operation is always much greater than the excitement before occasioned by them, a circumstance which generally follows the use of the mercurial preparations, and which, as is well known, never takes place after using tonics or the high diffusible stimuli.

2, By medicines, which remove the convulsive disposition by inducing the nerves into other motions. Emetic tartar, ipecacuanha, vitriolum album, flores zinci, cuprum ammoniatum, and argentum nitratum, are of this order. These medicines, though greatly differing from each other, agree nevertheless in this, that they remove the habitual epilepsy by inducing the nervous system into other motions. These do not prove beneficial in every epilepsy, but only remedy it, when it's material cause is previously removed; or when it is of such a nature, that it may be removed by the powers, which belong in particular to each of these medicines. Thus, if only the removal of a habitual epilepsy be required; that is, if the sole purpose be to take away the too great irritability of the

the nervous system; it is not always necessary to have recourse to the flores zinci, vitriolum album, cuprum ammoniatum, or argentum nitratum; for it is proved, that the emetic tartar, and ipecacuanha, are able to vanquish the disease, by communicating to the nerves the wished for alteration*.

But though nothing proves more efficacious to prevent the paroxysm from coming on than an emetic, given a short time, as an hour or two, before; yet it is to be observed, that vomits are not capable of freeing the system from the habit of running into irregular motions, except in cases, in which the epilepsy either observes fixed and regular periods, or in which the disease attacks every day, or in which the torpor of the senses, frightful dreams, pain in the head, giddiness, sensatio fornicationis in the affected parts, &c., foretel the approach of the paroxysm. For in cases, in which the epilepsy returns every week, fortnight, three weeks, or a month, &c., but does not observe a fixed day, no utility, I have found, is to be derived from the use of emetics, and they seem rather to do harm than good. Likewise in all cases in which the patients appear to be weak, emetics are not to be administered; for there, instead of being productive of any benefit, they render the disease more obstinate, and do a great deal of mischief, by farther weakening the system.

If it be asked, how the habitual epilepsy is to be removed by quite different medicines, which must

* Richter, *Medicinische und Chirurgische Bemerkungen*, cap. viii, seite 130 zu 136.

of course necessarily affect the nervous system in very different ways. I answer; that a double faculty is common to all the emetics, for, taken in a small dose, they all operate as powerful antispasmodics; whereas, when taken in a greater dose, they shock the whole body by exciting vomiting, and communicate new and unusual motions to the nervous system. From which double power it is easily to be accounted for, why such medicines; though operating in a different manner, all possess an antepileptic virtue, under certain circumstances.

As nevertheless the flores zinci, vitriolum album, cuprum ammoniatum, and argentum nitratum, not only possess the same qualities as the others in a greater degree, but, by their peculiar powers, are able to vanquish the epilepsy in many cases, where a material cause still exists; it is evident, that these medicines often produce salutary effects, where the emetic tartar, or ipecacuanha, would not afford the least help. If therefore the habitual epilepsy either be joined with acidity of the *primæ viæ*, or even derive it's origin from this source, nothing proves more useful than the flores zinci, on account of their antacid quality. In a word, in all cases in which the epilepsy had arisen from a morbid condition of the *primæ viæ*, I have seen the utmost success from the flores zinci, given from gr. iii to ʒ ß, three or four times a day, for they prove a very powerful tonic in strengthening the alimentary canal. If the debility of the body either be united with the too great irritability of the nervous system, or arise from this source, the vitriolum album proves beneficial by it's astringent and tonic powers; from which, both in the epilepsy and
other

other convulsive complaints, I have often seen very good effects. If, in fine, the morbid irritability of the nervous system be so great, that, though the material cause be removed, the convulsive disposition impressed on the nerves is not to be abolished by the above remedies; if this morbid irritability be united with great debility and relaxation of the body; or if the convulsive motions be owing to the debility and relaxation of the system; the physician should have recourse to the cuprum ammoniatum, which exceeds all the other medicines in these cases, and not unfrequently performs a cure after the other medicines have been tried in vain*. If, however, the too great irritability of the nervous system be either united with plethora, or produced by a plethoric habit, the cuprum ammoniatum is not to be given, until the plethora is removed by bleedings; which, if too copious, are not unfrequently succeeded by relaxation and debility, and thus a state is produced, in which the cuprum ammoniatum, noxious in the commencement of the disease, proves beneficial. Of this the celebrated Dr. Thuessink has given us a memorable instance†. I must farther observe, that, when the habitual or idiopathic epilepsy takes place in persons of a tender and delicate constitution, and of a tense fibre, in whom a debility of the system, but by no means weakness and relaxation, takes place, I have experienced the cuprum

* Gmelin, l. l. vol. i, sect. ii, p. 137 & 138: and *Het Zeezuwfs Genoodschap der Weetenschappen*, vol. xiv, from p. 363 to 396, containing an excellent dissertation of Dr. Thuessink on the use of the cuprum ammoniatum in nervous diseases, in which what I say on this subject is clearly proved.

† L. l. p. 390,

ammoniatum not merely to be uselefs, but on the contrary to bring on more frequent and violent paroxyfms; for the methodus operandi of this remedy is too ftrong for fuch irritable conftitutions. In thefe cafes I have found confiderable benefit from the bark and valerian given in conjunction with the vitriolum album. In fine, with refpect to the argentum nitratum, I have never tried this remedy myfelf, but I have feen it given three times in Guy's Hofpital, by Dr. Babington, in the St. Vitus's dance. In thefe cafes the difeafe was removed in a fhort time. It has been likewise exhibited by other phyficians in the epilepsy with fuccefs. It feems to act upon the fame principle as the others: given in a fmall dofe, it proves a powerful antifpafmodic; in a larger one, it occafions uneafinefs of the ftomach, retching and vomiting: as to it's tonic power, it feems not to be inferiour to any of the remedies here mentioned.

I have not noticed the viscus quercinus, the dittany of Crete, pulvis de gutteta Riverii, mufk, caftor, camphor, ammonia, and the leaves of the Seville-orange: for whatever has been faid with refpect to the antepileptic virtue of thefe medicines by fome authors, upon trial it will be found, that the viscus quercinus, dittany of Crete, and pulvis gutteta Riverii, are but of very fmall efficacy in nervous difeafes; and that the others, though powerful in removing inordinate motions of the nervous fyftem flighter in their degree than the epilepsy, are found much lefs efficacious antepileptics than the remedies, which I have taken the liberty to recommend. The flores cardamines, given from half a
drachm

drachm to a drachm three times a day, have been lately recommended; but as I never saw them tried, and do not find any mention of the particular circumstances, under which they have been useful, I cannot take any farther notice of them.

The operation of the medicines recommended may be very much assisted in many cases by procuring a discharge from the neighbourhood of the head by means of perpetual blisters, issues or setons; which have been very frequently found extremely useful in this disease.

Lastly, in cases of habitual epilepsy, a considerable change of climate, diet, and way of life, has sometimes effected a cure, where all other remedies had failed.

After all that has been said on the subject, we must acknowledge, that we are not yet acquainted with any practice, that proves a certain or even a general cure for the idiopathic epilepsy, and that it sometimes baffles the most skilful treatment.

When life is extinguished by the epilepsy it happens chiefly in the two following ways.

1, The vital principle is, as it were, abolished at a single shock by the violence of the convulsions, and then the patient expires in the paroxysm; which, however, but seldom happens.

2, The patient, having already had many paroxysms, falls at length into a more violent one, which
ends

ends in a mortal apoplexy. This termination of the disease is much more frequent than the former.

With respect to the other nervous diseases of the convulsive kind, the compass of this treatise does not permit me to take particular notice of each; and the less, as, though very frequently obstinate, they seldom prove mortal. I shall therefore confine myself to giving a general view of them, and laying down some general rules, which are to be observed in the cure of all convulsive diseases.

The nature of convulsive diseases consists in irregular and convulsive motions, brought on in consequence of the disturbance of the nervous system by some morbid stimulus. These convulsive motions have received different names according to the degree of their violence: for they differ only in degree, and the greatest analogy exists among them all with respect to their causes, prognosis, and treatment: so that what I have proved of the epilepsy holds likewise good with regard to all convulsive diseases. The other nervous diseases, however, being inferior to epilepsy in violence, are also less unfavourable in their prognosis; and the cure of them is not quite so difficult, being frequently accomplished by remedies insufficient to cure the epilepsy.

In the cure of nervous diseases the following general rules are always to be observed.

- 1, The physician ought to inquire whether the disease be sympathetic or idiopathic. The convulsive nervous diseases are, at least in their commencement,

mencement, very frequently sympathetic. Their chief sources are a morbid state of the *primæ viæ*, of the abdominal viscera, especially of the hepatic system, or of the absorbent vessels. To the state of these organs, therefore, nice attention ought to be paid in all nervous disorders. The distinction between sympathetic and idiopathic nervous diseases is of the utmost importance to the practitioner; for in the latter case the cause of the disease originates from a general affection of the nervous system, whereas in the first the origin of the disorder is to be looked for in the morbid state of some other organ, by which the brain becomes sympathetically affected; and the irregular actions of the nervous system cannot of course be remedied but by the removal of the morbid state of that organ; with which the brain sympathizes.

2, In all nervous diseases great care should be taken to clear the *primæ viæ*, and to keep off all irritation from them; for in the sympathetic nervous disorders the disease frequently originates from irritation of the *primæ viæ*, and is remedied by expelling the morbid stimulus: and even in the idiopathic nervous diseases, the alimentary canal for the most part sympathizes with the brain, and fordes are often collected in consequence of the morbid action of the nervous system. It is of the greatest moment, therefore, in the treatment of these diseases, to pay due attention to the state of the stomach and bowels, and to keep the *primæ viæ* clean, by exhibiting from time to time calomel and other purgatives.

3, As

3, As in the cure of all chronic diseases patience is to be recommended both to the person who labours under them and to the practitioner, so it is especially requisite in those of the nervous kind; for, though the patients may frequently be very much relieved in the course of a few days, yet perseverance in the use of nervous remedies is necessary to get completely rid of the complaint; since, if the patient leave off the use of them on the abating of the symptoms, the disease shortly returns with it's former violence. The nervous remedies ought of course duly to be persisted in for a long time, in order to effect a radical cure of the disease. In exhibiting them the physician ought, at least in irritable delicate constitutions, always to begin with small doses: for if this precaution be neglected, and large doses be exhibited at first to such patients, it frequently happens, that, by carrying the excitement too far, instead of removing the complaint, the system is thrown into violent convulsive motions by the very use of the nervous remedies.

With respect to nervous medicines, the limits I have proposed to myself in this treatise do not allow of an inquiry into which are the chief among them, and what the circumstances under which each of them is to be used. I cannot, however, forbear to mention, that, in the hysterical disorder without an apparent cause, and in other convulsive diseases, I have observed the utmost benefit from asafœtida; and that sometimes musk, castor, camphor, and other nervous remedies, having been administered in vain, the asafœtida, when it's use

was

was duly persisted in for a sufficient length of time, has either radically cured, or greatly relieved, the patient.

4, Although it is a fact, that the nervous diseases may now and then require bleeding and the antiphlogistic plan, yet it is not to be denied, that, for one case, where bleeding affords relief, there are at least twenty in which venesection would greatly injure the patient. Indeed in nervous diseases, as in almost all others, the antiphlogistic treatment has been carried a great deal too far; for in almost all cases nervous disorders are attended with debility in a greater or less degree. Hence, both in the idiopathic and sympathetic nervous diseases, though the convulsive disposition has been removed by the removal of it's cause, yet, in order to guard the patient against a relapse of the complaint, the system is to be strengthened; for if tonics be omitted, the disorder makes it's appearance again upon the slightest error in diet or manner of living. It may therefore safely be laid down as a general rule, that, in all cases, in which the convulsive motions have been removed without the use of tonics, recourse is to be had to them in order to secure the patient against the return of the complaint.

5, As the confidence the patient has in the skill of his physician is of great moment in the treatment of all diseases, this is more especially the case with regard to nervous disorders; for it contributes considerably to the cure of the complaint, if the patient be persuaded, that the physician has penetrated the true cause of the disease, and that

the remedies he takes will prove successful. The passions of the mind likewise extremely influence the cure of nervous disorders; so that often, when the patient has been already a great deal relieved, he becomes as bad and sometimes worse than before by putting himself into a violent passion. Nay these circumstances are of such weight in the treatment of these diseases, that unless the physician be capable of acquiring the confidence of the patient, and his mind can be kept quiet, the complaint frequently bids defiance to all remedies.

6, Lastly, the diet has a considerable share in the cure of these diseases. As we have above seen, that the nervous diseases may arise from various and even opposite causes, the natural inference must be, that no rules of diet can be recommended, to which there are not now and then exceptions to be made; but, making a due allowance for these particular cases, I am perfectly satisfied, that instead of starving the patients by a vegetable diet, as has been commonly the fashion, the food ought to be of the most nourishing kind, as chicken-broth, strong beef-tea, veal, beef itself, provided the stomach can digest it, along with vegetables abounding most in saccharine matter, as potatoes, rice, sago, &c. All debilitating drinks, as tea and coffee, are entirely to be forbidden. For breakfast a cup of chocolate may be taken. For the rest, the common drink ought to be cold water, the plentiful use of which I am sure is of the greatest moment in nervous diseases, and I have seen the most striking instances of it; but the quantity to be used ought to be suited to the circumstances of the case, and it

is always to be taken at first in small doses, especially in persons of an irritable constitution. A certain quantity of milk may be mixed with it in order to make it more agreeable to the palate.

But, though I recommend a tonic nourishing diet, as greatly contributing to the cure of nervous diseases, yet in general I think it most advisable to abstain from the use of wine : for, though wine, being a very powerful cordial, and a highly stimulating remedy, is one of the best means we possess in all fevers of the low kind to rouse the vital principle into action; nevertheless in chronic nervous diseases the stimulus of wine operates in general too violently upon the system, and, far from removing the complaint, a liberal use of wine, especially in an early period of life, is frequently the cause of these disorders. Indeed the nervous disorders are much more frequent among drinkers of wine, than among water-drinkers. Therefore, though in some cases it's use may be attended with advantage, in general wine, and all strong fermented liquors, ought to be carefully avoided.

It ought also to be observed, that, though I am an advocate for a diet of a tonic nourishing kind in nervous disorders, yet I am far from recommending the luxuries of the table ; for the diet, though chiefly of the animal kind, ought to be simple, and all excess is carefully to be shunned as highly injurious. It needs scarcely to be remarked, that in these cases, where the disease arises from tension and plethora, an exception takes place, and a vegetable diet, and the whole of the antiphlogistic regimen is to be carried into execution.

C L A S S XII.

DISEASES OF THE SECRETORY ORGANS.

THE diseases of the secretory organs are those, in which the secerning vessels undergo a considerable alteration, either in their action or structure, without an idiopathic pyrexia, neurosis, or cachexia. It is true that some or other of these is frequently met with in the inveterate stages of the diseases of the secretory organs; and sometimes they are all three combined with them: in this case, however, they are not idiopathic, but to be considered as effects of the morbid state of the secretory organs, by the cure of which they are generally removed.

As all diseases of the secretory organs may be reduced to alteration in their action, or in their structure, this class is thence divided into two orders.

O R D E R I.

Alteration of the Action of the Secerning Vessels.

G E N U S I.

Polysarcia.

POLYSARCIA is fatness to such a degree, that the functions proper to the body in it's healthy state
are

are either not at all, or at least with difficulty performed.

The predisposition to this disease exists in persons of a lax habit, infants, youth, and the fair sex. As nevertheless experience shows, that many such persons, though they rather provoke than avoid the occasional causes of corpulency by their diet and manner of living, often remain free from the disease; it is evident, that the above causes are not sufficient to account for polysarcia; but that a determinate predisposition of the solids, owing to their original conformation, is to be admitted as it's chief predisponent cause. In confirmation of this opinion it may be observed, that sometimes the evolution of the body itself suffices to incite the predisposed solids, a remarkable instance of which is to be found in the Philosophical Transactions. A man only twenty-nine years of age, six feet high, and almost seven feet in circumference round the belly, was so loaded with fat, that when naked he weighed six hundred and nine pounds, and did not accomplish his thirtieth year, though free from any other disease*. The exciting causes are high living, a sedentary life, neglect of exercise, &c.; all which tend to produce the complaint in the predisposed.

The nature of this disease is commonly believed to consist in a too healthy disposition of the body, by which more nourishment is drawn from the food than the body requires. I greatly doubt, however, whether this hypothesis be founded on the

* Vol. xlviii, p. 188.

observation of nature. For many plethoric persons, who are obliged to have recourse, from time to time, to an artificial evacuation of the superabundant blood, are rather lean than fat. Besides, as was observed above, this disease sometimes arises without any fault in diet. Lastly, this opinion is refuted by the very symptoms of polyfarcia; torpor of the vital principle always accompanies it's inveterate stage; and all the secretions languish, and become diminished, that of fat alone excepted. Therefore the nature of this malady seems rather to consist in a peculiar predisposition of the organs serving to the secretion of fat, or, to express myself more clearly, to a morbid irritability of these organs, by which, being very sensible to stimuli, they seern more than a due quantity of fat in a given space of time. Now, as it is a general law of nature, that the more the organs are exercised, and the more vigorous their action is, the more blood is conveyed to them, and this blood again operates as a stimulus to the discerning vessels; it must necessarily follow, that this disease daily increases inore and more, so that the other parts of the body become at length deprived of the due quantity of blood requisite to their nourishment, and almost the whole mass of blood is, as it were, spent in the secretion of fat. All the phenomena of the disease not only agree with this explanation, but it is farther confirmed by dissection. For the learned Dr. van Geuns relates, from the *Miscellanæ Naturæ Curiosarum*, that a man forty-two years of age, who died solely from too great a quantity of fat, “ exhibited in a vast body extremely thin bones, “ and very tender muscles, rather membranaceous “ than

“ than carnous, so that all the real flesh, in the
 “ whole body, at the most did not exceed ten
 “ pounds* :” an evident token, that polyfarcia is
 produced not by a superabundant nutritious matter,
 but by an immoderate action of the organs serving to
 the secretion of fat, defrauding the other parts of
 their due nourishment.

The prognosis of this disease is very ominous,
 since scarcely any hope of recovery exists.

The cure of this distemper should however be
 attempted by using a low spare vegetable diet, with
 much bodily exercise, and by inhaling at the same
 time the vital air, greatly recommended in this
 disease by Dr. Girtanner. In reality, the use of
 the oxygen gas seems to be advisable; as it may
 naturally be expected, that as a powerful stimulus
 it will rouse the vital powers to action, and thus
 both the superabundant secretion of fat will be
 stopped, at least in a great measure; for some degree
 of languor and debility seems to be requisite to this
 disease; and the lymphatics will be incited to the
 absorption of the fat already secreted. Vinegar,
 soaps, and the mephitic water, are also recom-
 mended for reducing too great corpulency; but
 these, if really of any use in this disease, do not
 operate at least by chemically resolving the fat, as
 has commonly been thought. All these remedies,
 however, are found in general insufficient to put a
 stop to the progress of the disease. I would there-
 fore recommend, in conjunction with them, a trial

* *Diff. laud.* § ii, in nota.

of the remedies, which we know most effectually operate upon the lymphatic system; such as the digitalis, mercury, squills, &c.; with which tonic and nervous medicines are to be combined, in order to support the constitution during their use, and to guard against the noxious effects, of which the former two in particular are frequently productive. These medicines deserve the more to be tried, as a remedy, by which the disease, at least in it's advanced stages, has been known to be cured, is not yet discovered.

If, as usually happens, the disease do not yield to the power of physic, the torpor of the vital principle and the languor of all the functions daily increase, the corpulent are rendered every day more and more unfit for motion, and at last they die, or rather cease to live: for, strictly speaking, they have been in a nearly dying condition for a long time, since this morbid quantity of fat operates as a poisonous stimulus upon the body, and lessens, or even suppresses the functions. The organs indeed resist the stimulus, and endeavour to preserve life, which in consequence is still kept up for a long time; however, as both the vigour of the organs, and their reaction to the stimulus daily decrease, at length their action is totally suppressed, they yield to the stimulus, and death, stealing slowly on by degrees, gently abolishes life. Such an euthanasia nevertheless does not frequently happen to those, who labour under polysarcia, as the suffusion of fat is seldom so distributed through the whole body, that all the functions equally suffer. Hence, if one vital organ be more surrounded than
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the others with fat, it's function becomes oppressed, to which oppression death always quickly succeeds; and for this reason the corpulent are mostly destroyed by an apoplexy, a suffocation, or syncope*.

ORDER II.

Alteration of the Structure of the Secerning Vessels.

THE difference between this order and the former is, that here the discerning vessels always generate a peculiar matter, either wanting in the healthy state, or deviating from it, which appears under a different form, according to the different modification of the secretory vessels.

GENUS I.

Diabetes.

THAT the rational practice of physic ought to be built upon the nature of the disorder, and that the diseases, the proximate cause of which is not yet ascertained, are the most difficult to be remedied, the diabetes affords a striking instance. On the proximate cause of this disorder physicians do not

* T. Schwencke, *Hæmatologia*, p. 22 & 23: van Geuns, l. 1. § ii, in nota: and Macbride, l. 1. p. 358.

agree; consequently different and even opposite manners of treatment have been pursued; all which probably, but under different circumstances, may be adopted with benefit to the patients. But the misfortune is, that writers on the subject have drawn general conclusions from one or two cases that fell under their care, and strongly recommend in all cases the remedies they used with success. As this disease has been very much the subject of medical conversation within a few years, I shall particularly inquire into the three opinions at present prevailing on the proximate cause of the disorder, and consider the principles upon which each of them is founded, in order to ascertain, which of them agrees with the phenomena of the disease.

The first is, that the diabetes is a disease of the system in general, and not a local disorder of the kidneys; and that it is owing to an imperfect assimilation. For as some time is requisite to the conversion of the chyle into blood, and during that time a considerable part of the chyle passes off by the mammæ of those females who give suck; so likewise, when the powers of sanguification are from any cause weak, and the conversion of the saccharine matter the chyle contains is consequently slow and imperfect, it may pass off by other secretions as well as that of the mammæ. Hence they explain the emaciation and debility which always attend the diabetes; for, a considerable quantity of chyle passing off by the kidneys, the other parts are deprived of their due nourishment, and the system cannot but become weakened.

This opinion is refuted, by the blood being destitute of sweetness in diabetes; an unequivocal sign, that the saccharine matter does not preexist in the blood. It is true, Dr. Dobson* records, that the serum of the blood in his patient was sweetish to the taste; but, as all other writers on the subject agree, that the serum is never sweet in diabetic patients, and the learned doctor himself observes, that the serum of the blood was only sweetish, but the urine very sweet, the truth of this experiment seems justly to be disputed; at least the considerable quantity of sugar found in the urine of diabetic patients cannot be accounted for from this source.

The argument drawn from the function the mammæ perform by no means favours this opinion; because it is founded upon the false principle, that human milk is the chyle itself. But daily experience proves, that the quantity of human milk is by no means in proportion to the food taken in. Many women, who suckle two children, have no extraordinary appetite, and are nevertheless strong and vigorous. The human milk always possesses the same properties, as well when the nurse has not taken any nourishment for some hours, as directly after dinner. Women, who labour under jaundice, and in whom thus no proper chyle can be formed, in general have very good milk, so that children may safely suck nurses labouring under this complaint, as the doctors Graewen and Schrage have frequently experienced†. I have myself seen

* *Med. Observ. and Inq.* vol. v, art. xxvii.

† *Act. servand. Civib.* T. xii, p. 13.

two ladies, who, though afflicted with the jaundice, had very good milk, and suckled their children during the whole course of the disease. The same is to be said of wet-nurses labouring under the venereal disease, who, when they have not had the confirmed lues upon them for a considerable length of time, may be permitted to suckle children without any injury: though it is to be observed, that this holds good only with regard to recent cases; since, in the inveterate stages both of the jaundice and lues venerea, as all the secretory organs become in time affected by the morbid stimulus of the contaminated blood continually acting upon them, the natural consequence must be, that the milk likewise undergoes a change from it's healthy state, and can no longer serve for properly nourishing the child. Lastly, anatomy proves beyond dispute, that the human milk, though agreeing with the chyle as to some properties, nevertheless is by no means a chylous fluid attracted to the mammæ before it is changed into blood; but on the contrary is the effect of a peculiar secretion going on in these organs, in consequence of a specific stimulus. For in the dissection of females giving suck, the blood-vessels going to the mammæ are found to be three times bigger than their ordinary size; an evident token, that a peculiar fluid is secreted by them from the blood. Hence may be readily understood, how both in the jaundice and lues venerea, when not inveterate, natural milk may be prepared from the contaminated blood by the secreting vessels of the mammæ.

Besides,

Besides, supposing that human milk really was chyle passing off by the mammæ, still the saccharine matter could not possibly be derived from this source; because it is well known, that the urine discharged in diabetes commonly equals or exceeds all the food and drink ingested; and that much more saccharine matter may be obtained from a given quantity of diabetic urine, than from the same quantity of milk. To show this still more clearly, the consideration of the history of a diabetic patient, who fell under the care of Dr. Dobson, will be wholly sufficient. This patient passed twenty-eight pints of urine every twenty-four hours. He took, during the same space of time, from twelve to fourteen pounds of solid and fluid nourishment, and the same quantity of drink; a large proportion of which, we are informed, was likewise of the nutritive kind. The food and drink taken in was thus at the utmost barely equal to the urine discharged. The drink was only in a large proportion of the nutritive kind: whence we may safely state, that the drink of the nutritive kind did not exceed ten pounds, which added to the fourteen pounds of nourishment the patient took every day, make twenty-four pounds, and thus four pounds less than the urine discharged. More than double the quantity of saccharine matter may always be extracted from any quantity of diabetic urine, than can be obtained from the same quantity of milk, a humour resembling the most of all the chyle as to it's properties. Besides, no nourishment whatever can be wholly changed into a nutritious fluid, of course twenty-four pounds of solid and fluid nourishment cannot afford twenty-four pounds

of

of chyle. Therefore admitting the whole of the alimentary matter to be carried to the kidneys, yet even this would not be sufficient to account for the considerable quantity of sugar to be extracted from the urine of those who labour under the diabetes mellitus. Not to speak of the excrementitious fluids, which every twenty-four hours pass off by the other emunctories.

But it may perhaps be argued, that, if we be to look upon the chyle and the human milk as two different fluids, the natural inference must be, that the proportion of sugar contained in a given quantity of milk cannot be employed to prove, that the sugar found in the diabetic urine is not to be derived from the alimentary matter drawn off by the kidneys, but from a peculiar secretion of sweet urine. This objection however will be found of no weight. On considering that milk and chyle, though different liquors, yet approach very near each other in many properties: that when I make the calculation, I suppose, that the whole of the food and drink is converted into chyle, which, as it is well known, is never the case: that, in fine, it is equally obvious, that all the food and drink taken together would not probably furnish more saccharine matter than may be had from the same quantity of milk, and thus, of course, though milk and chyle are different fluids, yet the quantity of sugar contained in the human milk may serve us to compute, at least on an average, the quantity of sugar to be found in the chyle itself.

Lastly,

Lastly, that diabetes is not an affection of the system in general, but a local complaint of the kidneys, appears from this: that in the inveterate stages of diseases attacking the general habit, as scrofula, scurvy, and the lues venerea, all the secretions are vitiated and partake of the morbid diathesis prevailing in the system; but in the diabetes, when not combined with any other disease, even in it's most advanced stages, all the secretions, that of urine alone excepted, are performed according to the laws of health.

This opinion of the nature of the disease is thus founded upon a mere hypothesis, and refuted by the very symptoms of the disease.

As to the second, the opinion of Dr. Rollo, though it has some analogy with the previous hypothesis, as in both theories diabetes is considered as a disease of the system in general, yet it differs from the former in this, that, according to the former opinion, the origin of the disorder is to be imputed to the weakness of the powers of sanguification; whereas Dr. Rollo looks upon the stomach as the source of the complaint. This physician is of opinion, that the diabetes mellitus depends on a hyperoxygenated state of the system, occasioned by a morbid state of the stomach, which consists in an excessive action, of a morbid kind, of the muscular fibres of the stomach; with the secretion of too great a quantity of the gastric fluid, and some alteration in it's quality, producing with substances capable of forming it saccharine matter; and a certain defect in the powers of assimilation, depending

pending also in part on too active a state of the lacteal vessels. Of course he holds, that the system is to be deoxygenated: and thus the obvious remedies for the cure of this disorder are those that abstract oxygen from the system. This indication, in his opinion, is to be answered by breathing a lowered atmosphere, by confinement in a small room, abstinence from exercise, rubbing the skin with hog's lard, the use of a diet of animal food as rancid as it can be eaten, and the internal exhibition of the hepatised ammonia and narcotics. To prove this opinion the doctor makes use of the following arguments.

1, That a morbid condition of the stomach is to be considered as the origin of this disorder, is evident from the keenness of appetite, which accompanies diabetes; from the feeling of pain or uneasiness in the region of the stomach; and from a strong tendency to acidity, always observed in this distemper.

2, That a hyperoxygenated state of the system takes place, is not less manifest from the benefit brought on by the use of remedies abstracting oxygen. For the formation of the saccharine matter may be removed in a short time by making use of animal food solely; and by avoiding vegetables it will not be again reproduced: while the disorder is increased by the use of vegetables, and when removed is brought on again by it.

3, This opinion is farther proved by the powerful effect of remedies, which diminish the action
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of the system in general, and of the stomach in particular, as confinement, venesection, emetics, hepatised ammonia, camphor, and narcotics.

4, The condition of the blood, altered from it's healthy state, is a fresh argument to prove, that diabetes is by no means a local disorder of the kidneys, but a disease of the whole system. For though the blood taken in any period of the diabetes is not sensibly sweet to the taste, Dobson's case excepted, yet it's serum has a wheyish appearance.

5, The decrease of the quantity of urine being in proportion to that of the saccharine matter, is another argument demonstrating this opinion: as this phenomenon is to be accounted for from the corresponding diminution of the action of the kidneys, when the action of the stomach has been diminished; while, if a change of structure in the kidneys of a nature different from mere enlargement of vessels took place, the diminution of urine would not have been so speedy and determinate.

6, Lastly, that a hyper-oxydation of the system takes place in diabetes, and that it is removed by animal food, seems clearly to be demonstrated by the appearances of the blood in the doctor's first patient before and after it's use. The patient being bled previous to the diet of animal food, the serum of the blood had the appearance of whey, and the crassamentum had a buffy coat of a bluish colour, similar to what mercury sometimes produces. Whereas, after having made use of animal food

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solely for a long time, the blood was covered with a very thin pellicle of coagulable lymph of a loose texture resembling the white of an egg, except which there was no other separation of parts exhibited. The phenomena observed after the two bleedings were not less different: for after the first the patient became lighter, and more cheerful; whereas after the second he felt himself heavy and languid. Hence the doctor concluded, that an opposite state of the system had been produced, or that by the use of animal food the system had passed from a hyperoxydated to a deoxydated state, approaching to that of scurvy, into which disease diabetes may thus probably be changed, by continuing to live only upon animal food*.

With the utmost deference to the abilities of this physician, I am very much disposed to doubt, whether these arguments really prove what the doctor would deduce from them. The contrary, in my humble opinion, will readily appear, upon a more minute inquiry into each.

As to the first. That keenness of appetite generally accompanies diabetes is beyond dispute: however, the inference, that the stomach is the seat of the complaint, cannot thence be drawn. For, if it were so, the keenness of appetite should be a characteristic mark of diabetes; whereas experience teaches, that in the jaundice, and in many other diseases, a voraciousness often takes place without diabetes; and on the contrary this disease

* See Rollo, l. l. vol. i, p. 48 and 266.

is sometimes met with even with a loss of appetite, as in the case mentioned by Dr. Dickson of a diabetic patient, whose appetite was quite gone *. The patient who fell under the care of the late Dr. Oosterdyk also had no appetite †. The appetite is much stronger in some patients than in others; without any corresponding influence of the disease. Dr. Richter does not mention the increased appetite among the symptoms of his diabetic patients; he only observes, that they generally had a good stomach. Dr. Frank seems also to have met with no extraordinary appetite in his patients labouring under diabetes. Even the cases recorded by Dr. Rollo prove, that in diabetes the appetite may be more or less keen, without any corresponding diminution of the disorder: for he mentions one case, in which the appetite was very keen, at the same time, that the thirst and the other symptoms were very much abated, and the quantity of urine was reduced from seventeen pints to two pounds ten ounces ‡. It appears also from another case, related by the same author, that the appetite may be less vigorous, or even quite gone, notwithstanding the disorder is getting worse, instead of being diminished §. Hence it is evident, that the keenness of appetite is not a characteristic mark of diabetes.

With respect to the feeling of pain, or of an uneasy sensation in the region of the stomach, and

* *Med. Obs. and Inq.* vol. 3, art. xv, p. 140.

† *Hollandische Maatschappij der Wetenschappen*, 12 deel berigten, p. 30.

‡ *L. l.* vol. ii, p. 88.

§ *L. l.* vol. ii, p. 101.

a strong tendency to acidity, symptoms with which the disorder is often attended; these likewise do not constitute characteristic signs of diabetes: for in some cases only one of them, or even neither, is present *. Dr. Rollo, in his second volume, mentions different cases, in which these symptoms did not appear: which shows, that, though frequently accompanying diabetes, they do not belong to it's nature. This is farther proved by persons, who, though labouring under an uneasy sensation in the region of the stomach, and the utmost acidity of the *primæ viæ*, still show not the least sign of diabetes. It is well known, that sometimes a diseased state of the secretory vessels of the stomach takes place, of which a morbid secretion of the gastric juice is the consequence. The patients have in these cases as it were, "a brewery of vinegar in the stomach;" and, though living upon animal food solely, they only experience a short relief or mitigation of the disorder. This morbid state of the stomach is likewise often attended with voraciousness. But though here all the symptoms are present, from which Dr. Rollo concludes, that the seat of diabetes is in the stomach, the secretion of urine goes on in the same manner, as in the healthy state; which clearly proves, that the seat of the complaint in the diabetes is not the stomach, but that the action of this organ is altered in diabetes by sympathy, and in consequence of the morbid state of the kidneys. It is worth while farther to observe, that, according to the observations of Dr. Richter, pills composed

* Richter and Frank, l. l.

of equal parts of asafœtida and the gall of an ox, are to be considered as a specific for the morbid state of the stomach just mentioned*. I have pretty often had an opportunity of treating such patients, and from my own experience I dare venture to say, that the asafœtida alone answers the purpose nearly as well, and several other physicians have assured me, that they have observed the same. Now the asafœtida has been exhibited by Dr. Home in diabetes, but with no happy effect. I shall here make use of the doctor's own words. "I gave him a drachm of asafœtida in the day, but it took away his appetite, was attended with a feverish state, and was at last given up as disagreeable to him. It seemed rather to hurt him †."

All this leaves no doubt, that the proximate cause of diabetes is not to be looked for in the stomach; but that the morbid state of this organ is an effect of the disorder, on account of the sympathy, which exists between the stomach and the kidneys; since, when the kidneys labour under any disorder, the action of the stomach for the most part becomes disturbed. The voraciousness therefore observed in diabetes is to be imputed partly to the sympathy of the stomach with the kidneys, and partly to a salutiferous effort of nature, by which she attempts to repair the unusual loss. Thus, as Dr. Dobson justly observes, in the cases, in which the extraordinary appetite happily keeps pace, at least in some measure, with the necessities

* L. 1. kapitel xv.

† *Chemical Experiments*, 2d edition, p. 319.

of the system, the diabetes becomes a chronical complaint; whereas, if the appetite fail, the disorder, when not soon remedied, generally proves a very rapid consumption.

As to the second. That the formation of saccharine matter will be removed by putting a diabetic patient upon animal food solely, I have not the least doubt. That the disorder increases by living on vegetables, or rather by making use of the usual diet, and when removed is brought on again by it, is equally certain. Dr. Babington, one of the physicians to Guy's Hospital, in order to ascertain the certainty of it, put a diabetic patient, who was a little while ago in Guy's Hospital, upon animal food during twenty four hours, and his urine became saltish; then he gave the patient leave to eat vegetables, and his urine became sweet again; he repeated this experiment twice, and the event was always the same.

Thus it appears, that destroying the sweetness of the urine and removing the disease are two very different things: for this experiment shows, that the sweetness of urine may be removed, without removing the disorder itself; as it was evident from the quantity of urine voided, that the disorder was still going on, though the formation of the saccharine matter was suspended by the animal diet. Indeed nobody would venture to say, that this patient was free of the diabetes, because his urine was quite salt.

The cases related by Dr. Rollo serve likewise to show, that though to destroy the formation of saccharine matter, and to render the urine quite salt, the living upon animal diet, even for a short time, is sufficient; yet such a diet only palliates the disorder, and is never capable of accomplishing a radical cure. To get completely rid of the disease, Dr. Rollo himself, and other physicians have been obliged to make use of emetics, laudanum, hepatised ammonia, issues in the region of the kidneys, camphorated tincture of opium, the cold bath, &c. Indeed not a single case is mentioned in which animal food alone has remedied the disorder. Hence, though the animal diet has been continued during a long time, yet, on returning to the common manner of living, the sweetness of urine is directly reproduced; of which we have a striking instance in the second patient of Dr. Rollo. Having lived upon animal food for more than six weeks, and his urine being in the mean time of a pungent, saline, and bitterish taste, nevertheless, upon returning to the common diet, his urine became sweet again*. Thus the living upon animal food puts a stop to the secretion of saccharine matter; but does not remedy diabetes itself; for though saccharine matter cannot be drawn from the urine of diabetic patients, after having made use of an animal diet during some space of time; yet the secretion of urine does not go on according to the laws of health; as it appears from chemical inquiries made into the urine of diabetic patients, who lived upon animal food, that the properties of this fluid,

* Rollo, 1. l. vol. i, p. 133 and 136.

though different according to various circumstances, never are perfectly such as are observed in the healthy state, and that sometimes unknown salts are met with in the urine, when subjected to evaporation *.

The animal diet, however, though it is incapable of radically curing diabetes, and only effects a palliative cure or a temporary relief, is notwithstanding of the greatest advantage in diabetes, and the public is very much obliged to Dr. Rollo for his discovery; because it is a matter of importance, to prevent the formation of saccharine matter, which cannot be carried on without great damage to the constitution, and when it is prevented, the physician has an opportunity of using powerful remedies to accomplish the radical cure. But by what means does the living upon animal food suspend the formation of saccharine matter, and on the contrary the using of vegetables reproduce it when removed? If we consult Dr. Rollo, we are told, that, in diabetes, the system, being in a hyperoxygenated state, becomes deoxygenated by the animal diet; whereas vegetables, by furnishing fresh oxygen to the system, keep up the morbid disposition of the stomach to produce saccharine matter from substances capable of forming it.

However, if we consider the constituent parts of animal food, and if we a little more minutely inquire into the cases recorded by Dr. Rollo himself, we shall find, that this hypothesis is founded

* Rollo, l. l. vol. i, p. 115 and 118.

upon very feeble grounds. Upon inquiry into the first or primary principles both of the animal and vegetable kingdoms, we shall find, that all vegetable substances may by analysis at last be reduced to three first principles, namely, hydrogen, carbone, and oxygen, to which we must add in a few plants a little azote; and that the animal kingdom has four first principles, carbone, hydrogen, oxygen, and azote. The difference between animal and vegetable substances then consists chiefly in the presence or absence of azote; oxygen being present in a large quantity both in vegetable and animal substances. Thus if diabetes depend on a hyperoxygenated state of the system, and the disorder be to be cured by remedies abstracting oxygen, it is truly surprising, that this indication can be answered by substances containing a large quantity of oxygen; the less, as animal substances, from which oxygen may be obtained in abundance, are chiefly recommended in the disease; for blood-puddings, and fat as rancid as it can be eaten, are found very powerful in preventing the formation of saccharine matter. Now that blood contains a large quantity of oxygen, no one will question. This is equally certain with respect to fat; as this substance is well known to be composed of hydrogen, and carbone combined with a considerable proportion of oxygen, which is still increased, when it grows rancid. Indeed how the system can be deoxygenated by such substances, is very difficult to be understood; on the contrary, if a hyperoxygenated state of the system really took place in diabetes, it is to be apprehended that, instead of deoxygenating the system, the hyperoxygenated state of it would be still farther increased

creased by the very use of the above substances. Dr. Frank and Dr. Ferriar have cured the disorder by the use of tonics*; and Mr. Scott has twice remedied diabetes by using nitrous acid and mercury†. Now it is pretty clear, that these remedies, of which the last two in particular are ranked among the chief remedies imparting oxygen to the system, by the advocates of the pneumatic doctrine themselves, cannot possibly operate in diabetes by abstracting oxygen from the system.

This being sufficient to show, that the animal diet does not act by abstracting oxygen from the constitution, I now proceed to demonstrate, that the reproduction of the sweetness of urine by using vegetables is equally far from corroborating in the least the doctor's opinion.

To prove this, it will be enough to observe, that the saccharine matter, which may be had from the urine of diabetic patients, mostly exceeds very much the quantity of the vegetables used, as upon an accurate inquiry would appear from all the cases recorded by Dr. Rollo, but for brevity sake I shall mention only one. The patient took in twenty-four hours two pounds and half of animal food, with some potatoes and bread, and twelve pounds of liquids, including milk, beer, and water. During the same space of time his urine amounted to seventeen pints, which yielded on evaporation two pounds and half of saccharine extract‡. Now supposing all the vegetable substances used to be

* See Frank, l. l. and Rollo, l. l. vol. ii, p. 203.

† Rollo, l. l. p. 203 and 204.

‡ L. l. vol. ii, p. 75.

completely changed into pure sugar, it is impossible to account for this quantity of saccharine matter from that source. In two other cases mentioned by Dr. Rollo, milk, a liquor containing much more sugar than many vegetables, was allowed to the patient without seemingly occasioning the least detriment*. If however the patient make use of a milk diet, the sweetness of urine is reproduced, as I have had an opportunity of observing in the diabetic patient, who was some weeks ago in Guy's Hospital, when ordered by Dr. Babington to live only upon milk during twenty-four hours. But this experiment, far from serving to support the hypothesis of Dr. Rollo, as would seem at the first appearance, extremely corroborates our opinion, for much more saccharine matter may always be extracted from any quantity of diabetic urine, than is contained in the same quantity of milk. Thus, though the stomach had extracted all the sugar, which might be had from the milk, yet the saccharine matter found in the diabetic urine could not be accounted for from this source; and the less as the urine of this patient far exceeded the quantity of food and drink taken, was remarkably sweet, and yielded on evaporation a considerable quantity of saccharine matter. Not to mention, that, if a disposition of the stomach to produce saccharine matter from substances capable of forming it really took place in diabetes, the formation of saccharine matter would be still going on, though the patient lived upon animal food: because the carbone, the hydrogen, and the oxygen, substances of which sugar is composed, are equally met with both in the animal and vegetable kingdoms.

* L. l. vol. i, p. 82; and vol. ii, p. 72.

It appears thus, that the hyperoxygenated state of the system is not in the least proved by the prevention of the formation of saccharine matter by the animal diet, and by the reproduction of it by using vegetables.

If it be asked, how the formation of the saccharine matter is prevented by animal food, and reproduced by the use of vegetables, I answer, that accurate experiments, showing the formation of the saccharine matter to be increased by a vegetable diet, are hitherto wanting; for, as far as I know, no diabetic patient has ever been put on vegetable diet solely; and it has only been ascertained, that, by having recourse to the common diet, the sweetness of urine, when removed by animal food, returns again. Supposing, however, that it was proved, that the formation of sugar by the kidneys is increased by vegetable diet, it would still be explicable only from a peculiar manner of operating on the kidneys brought on by the specific stimulus of a vegetable diet, the consequence of which is a secretion of sweet urine; because it is demonstrated above, that the considerable quantity of saccharine matter found in the diabetic urine cannot possibly be drawn from the vegetables themselves by a morbid action of the stomach.

The absence of the saccharine matter during the use of animal food is, in my opinion, to be explained in the following manner. By living upon animal food alone a new stimulus is communicated to the kidneys, by which these organs, being specifically stimulated, specifically react; the consequence of which reaction is, that, instead of sweet urine, they secrete

secreting urine destitute of sweetness: but by ceasing to live upon animal food, before the secretion of urine is reduced to the laws of health by proper remedies, the preternaturally affected kidneys, being no more impeded in their action by the specific stimulus of animal food, directly secrete again urine sweet to the taste.

This opinion is supported by these considerations; first, that the nature of the fluid prepared by the secreting vessels in a great measure depends on the different stimuli communicated to them: thus, for instance, the vessels, which supply the urethra with mucus, being specifically stimulated by the venereal poison, secrete a peculiar fluid, capable of propagating the venereal contagion; the vessels of the schneiderian membrane secrete frequently, instead of their usual secretion, a fluid possessing different properties according to the different stimuli applied to the secreting surface; and the same holds good with respect to all other secretory organs: and, secondly, that the secretion of urine undergoes various changes in various diseases according to the different stimuli communicated to the kidneys.

Animal food seems therefore to operate in diabetes by communicating another stimulus to the secretory vessels of the kidneys, by which a stop is put to the secretion of the saccharine matter, as long as the stimulus of animal food is continued.

As to the third. The good effects, which are observed in diabetes from bleeding, emetics, narcotics, camphor, and the hepatised ammonia, prove nothing in favour of the doctor's opinion: for
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bleeding by no means brings relief in all cases, but, as I shall have an opportunity of proving below, is useful only on certain occasions; and with respect to the other remedies, it is well known, that not one of them operates upon the stomach alone; on the contrary, some of them act on other organs much more than upon the stomach. On taking a general view of the powers, which all the above remedies possess in common, we shall find, that they operate either by diminishing the irritability of the system in general, and of the kidneys in particular, or by communicating other motions to the system, and to the urinary organs; by both which means the morbid disposition impressed on the kidneys to secrete a peculiar sweet urine may be abolished. Thus the benefit arising from the above remedies does not afford an argument for proving, that diabetes consists in a morbid state of the stomach. On the other hand, Dr. Brisbane has found the tinctura cantharidis, which, as is commonly known, particularly operates on the urinary organs, to be a powerful medicine to cure diabetes*: an evident sign, that the kidneys are to be looked upon as the seat of the disorder.

The fourth argument, of which Dr. Rollo makes use, is the condition of the blood altered from it's healthy state; for the doctor says, that though the blood, drawn in any period of the disease, was never found perceptibly sweet to the taste, except in Dobson's case, yet it's serum showed a wheyish appearance. This argument, I beg leave to ob-

serve, instead of demonstrating, that diabetes is a disease of the system in general, seems on the contrary a strong proof, that it is nothing but a local disorder of the kidneys; for the blood, according to the testimony of Dr. Rollo himself, is found destitute of all sweetness, at the same time when the urine is found very sweet: a manifest sign, that in diabetes the sugar does not pre-exist in the blood, and of course the formation of the saccharine matter is not effected by the stomach, but by the secreting vessels of the kidneys. It is indeed true, that the blood is generally altered from it's healthy state in inveterate diabetes, and it's serum shows a wheyish appearance. This change of the blood however is by no means to be looked upon as a cause, but as an effect of the disease; for in general diabetic patients do not seek for medical assistance, till the disorder has continued some months; and it is a natural consequence, that the blood of those, who have laboured several months under this disorder, should show some deviations from it's healthy condition. The change observed in the blood is therefore an effect of the disorder, and by no means it's cause, and hence in an early period of diabetes these phenomena are often wanting, as Dr. Home found no appearance deviating from that of health, but a thick inflammatory crust, in the blood of one of his patients*.

Fifthly. The decrease of the quantity of urine being in proportion to that of the saccharine matter seems to Dr. Rollo, to be another argument sup-

* L. l. p. 319.

porting his hypothesis. According to the doctor's opinion, this phenomenon is to be accounted for from the corresponding diminution of the action of the kidneys, when the action of the stomach has been previously diminished: since, if a change of structure, of a nature different from mere enlargement, had taken place in the kidneys, the diminution of urine would not have been so speedy and determinate. With regard to this I must remark, that the decrease of the quantity of urine is not always in proportion to that of the saccharine matter; for in the second case recorded by Dr. Rollo, the patient being put upon animal food, his urine became saltish, yet it's quantity was four pints and a quarter, though the liquids taken were only four pints*. The patient, who was lately in Guy's hospital, when he had lived upon animal food and biscuit for some weeks, and the sweetness of his urine was quite destroyed, still voided a great deal more than the quantity of liquid swallowed; the proportion being in general as eight pints to five. This is farther demonstrated by the diabetes insipidus, in which a considerable quantity of limpid urine, destitute of sensible sweetness, is daily discharged. But supposing, that the decrease of the quantity of urine was truly always in proportion to that of the saccharine matter, nothing could be concluded from this, but that the secretory vessels of the kidneys were in some measure restored to their usual action. For the objection made by Dr. Rollo, that, if a change of structure of a nature different from mere enlargement took

* L. l. vol. i, p. 117.

place in the kidneys, the diminution of urine would not have been so speedy and determinate, is of no weight; as it is well known, that, by using powerful remedies, an abatement of symptoms may speedily take place in diseases, in which the afflicted organs undergo an undoubted change of structure. For instance, in rachitis a change of structure of the mesenteric glands takes place; and yet even in the highest degree of the disorder, by making use of proper remedies, often a relief of all the symptoms is speedily effected. In dissections of persons destroyed by scurvy a change of structure of some organs is likewise evident*; yet a scorbutic patient, though seemingly half dead, is soon restored to his former health by a plentiful use of fresh vegetables. These instances prove, that a change of structure of the affected organ in some degree may exist, and still a quick recovery may ensue: of course the speedy restoration of the kidneys to their usual office does not afford an argument for the opinion of Dr. Rollo. Lastly, it ought to be observed, that, though in some cases of diabetes a relief of the symptoms is quickly perceived, upon the whole the cure of this disorder, far from being speedily performed, is extremely tedious, and in general the kidneys are not reduced to their natural action but slowly and by degrees; especially if the case have been of long standing.

The sixth and last argument of Dr. Rollo is taken from the appearances of the blood observed in his first patient before and after the use of animal food. The patient being bled previous to it, the serum of the blood had the appearance of whey,

* Lind, l. l. pt. ii, chap. vii.

and the crassamentum had a buffy coat of a bluish colour, similar to what mercury sometimes produces: whereas, after having made use for a long time of animal food, the blood was covered with a very thin pellicle of coagulable lymph of a loose texture, resembling the white of an egg, except which there was no other separation of the parts exhibited. The phenomena observed after the two bleedings were not less different. After the first, the patient became lighter, and more cheerful; on the contrary, after the second, he felt himself heavy and languid. Thus it appears, says the doctor, that an opposite state of the system had been produced; or that, by the use of animal food, the system, from a hyperoxygenated state, was brought into a deoxygenated one, approaching to that of curvy; into which disease diabetes thus probably may be changed by persevering to live upon animal food.

Though to refute this argument it would be sufficient merely to observe, that it is by no means ascertained, that the same phenomena are constantly met with in diabetes; that from one singular case no general rule can be drawn, and that no hyperoxygenated state takes place in this disorder: nevertheless, that not the least doubt may remain, I shall inquire a little more minutely into this argument. “ The patient being bled previous to the animal diet, his blood had a buffy coat.” But the buffy coat is by no means constantly met with in diabetes. In Dr. Dobson’s case the buff of the crassamentum was very slight: in the other patients of Dr. Rollo no buffy coat has been mentioned: in the patients
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of Dr. Frank the blood had no buff at all: and upon an accurate inquiry into the cases, where a buffy coat was observed, we shall find, that it has been chiefly met with in patients of a sanguine and irritable temperament; and that in these cases either a constant pain was felt in the region of both kidneys; or a local pain in the thorax, a severe cough, and a difficulty of breathing, were present. In a word, we shall find, that in these cases an inflammatory state of the blood has been combined with diabetes; which being removed by bleeding, the patient of course was relieved. As to the loose texture, and the other appearances of the blood observed after a long continuance of animal food: it is not yet proved, that living upon animal food for some time gives the blood a propensity to dissolution; and from one solitary instance no general rule can be laid down: particularly as it is evident from the example of some savage nations, that persons enjoying good health may live chiefly upon animal food during their whole life, without experiencing such effects.

But supposing, that it was always the case in diabetes, these phenomena would prove at most, that the blood in diabetes undergoes a change by living upon animal diet, and by no means, that the system is reduced to an opposite state: for we saw before, that the buffy coat is not always observed previous to the animal diet; that in diabetes no hyperoxygenated state of the system exists; and that the recommended animal food contains plenty of oxygen, consequently it cannot possibly operate by abstracting oxygen from the system, and therefore no deoxygenated state of the system can be brought on by its use. In fine, the as-

sertion of Dr. Rollo, that the loose texture of the blood after the animal diet proves an approach of the patient to scurvy, and thus that diabetes probably may be changed into this disorder merely by persevering to live upon animal food alone, seems to be very ill-grounded. For it appears, by the experiments made by Dr. Lind, that the blood even in the highest degree of scurvy is of a due firmness; and from my own experience I venture to say, that the blood, in the first stages of the scurvy at least, is not at all of a looser texture than ordinary. Of course the inference drawn by Dr. Rollo from the loose texture of the blood falls to the ground. The more, as in the first stage of scurvy the solids alone are altered in their action, and not the least disorder of the fluids is to be observed, unless in those organs, in which the scurvy has already made considerable progress. That in the patient of Dr. Rollo not the least symptom of scurvy took place; and that the loose texture of the blood, though it were always met with even in the commencement of the scurvy, is nevertheless insufficient to prove the existence of this disorder, without being attended with the usual symptoms of scurvy: since in putrid disorders the blood is likewise of a loose texture; I pass over in silence: because the above arguments are quite sufficient to show, that both the hyperoxygenated state of the system in diabetes, and its change into scurvy, are founded upon a mere hypothesis, contradicted by the very symptoms of the disease.

As thus the opinion of Dr. Rollo is unsupported by the phenomena of nature; so it is not proved,

even by a single observation, that the stomach in any disorder has the power of producing saccharine matter with substances capable of forming it, but it is all founded upon a mere supposition.

As Dr. Rollo, nevertheless, has attempted to establish a nosologic system in compliance with the doctrine of hyperoxydation and deoxydation; and as some physicians seem to embrace his opinion; before I proceed to propose the third opinion on the nature of diabetes, I cannot but in a cursory way take notice of this system; which, if generally adopted, would no doubt cause more injury to mankind, than the new doctrine of chemistry has afforded benefit.

The extreme links of this system are formed by diabetes and scurvy. Unquestionably the least affinity does not exist between these disorders: but is the system in a hyperoxygenated state in diabetes, and does an animal diet operate by abstracting oxygen from it? We saw before, that both these are suppositions not founded on the observation of nature. In the scurvy, according to this system, the body is in the highest degree of deoxydation. It is, however, a little difficult to be understood, how the system can be induced into such a deoxygenated state, by living upon the usual provision of a ship, some of which contains oxygen in a pretty large quantity. Besides, as in compliance to this doctrine the appetite must be voracious, or at least very keen in diabetes, in the scurvy of course we should naturally expect to find the appetite quite lost; this however is by no means the case, the appetite is generally good even for salt

meat. If the scurvy consisted in a deoxygenated state of the system, fresh vegetables would never be requisite, as the quantity of oxygen wanting could be furnished by giving vinegar, elixir vitrioli, &c. But it is well known, that these remedies are of no use at all in this disease. If to cure the scurvy it were only requisite to communicate fresh oxygen to the system, nitrous acid, one of the chief remedies for imparting oxygen, no doubt would prove useful in this disorder. Yet Dr. Trotter, one of the chief advocates of the pneumatic doctrine, confesses himself, that nitre dissolved in vinegar did not produce any favourable appearances in a hundred and fifty-two cases of scurvy *: an evident proof, that the cure of the disorder does not consist merely in supplying fresh oxygen to the system.

Syphilis, according to this opinion, differs only from the scurvy as to its degree; namely, though the system is in a deoxygenated state in both disorders, yet the degree of deoxydation is less in the lues than in the scurvy. If this were really so, the natural inference would be, that the preparations of mercury should prove salutiferous in both by supplying oxygen to the system; and though they could not furnish a sufficient quantity of oxygen to perform a radical cure of the scurvy, at least when these two disorders are united, they would cure the lues, and even abate the symptoms of the scurvy; whereas the preparations of mercury are found so contrary to the nature of the scurvy, that not only in this disorder, but even in the lues when combined with a scorbutic diathesis of the system, the

* Rollo, vol. ii,

preparations of mercury occasion the greatest injury to the constitution, and cannot be given with safety, before the scurvy has been cured. If the lues depended on the same cause as scurvy, but inferiour in degree; it would not be necessary to have recourse to mercury or to nitrous acid; and no patient, though labouring under the highest degree of the venereal disease, would want the assistance of any medical man; he need do nothing more than eat plenty of oranges, by using of which in a large quantity, especially in conjunction with a vegetable diet, the system would be soon reduced to it's requisite state of oxygenation, and thus the disorder would easily be eradicated, and in a very pleasant manner.

In the inflammatory diseases no doubt an excess of oxygen exists; accordingly animal diet, confinement, opium, hepatised ammonia, and other sedatives, ought to be employed: that is, if the disorder consist merely in a hyperoxygenated state of the system, but it is well known, that in phlegmonic inflammations both animal food and opium are injurious; and on the contrary vegetables, though containing plenty of oxygen, are highly beneficial. Hence it appears, that the excess or want of oxygen in the system is not the cause of diseases, but the effect of them, and to be remedied by the removal of the disorder itself.

It would be easy to add to these examples, were not the instances, which I have already given, quite sufficient to show, that, as on one side the physicians, who deny the influence of the chemical powers in the animal economy, and the great ad-

vantages, which necessarily must result from a prudent application of the new discoveries of chemistry to the healing art, in compliance to mere custom, and the doctrine of the ancients, willingly shut their eyes against truth and daily experience; so likewise on the other hand, on considering the animal frame, we are taught that a living body is by no means a mere pneumatic machine, but that the chemical powers, when applied to it, operate in a far different manner from what they do when applied to inanimate matter; for in the living body they are modified by the vital principle; that, therefore, all chemical operations in the animal body are to be looked upon as compound results of the chemical powers, and of those which are added to them by the conjunction with the vital powers, and these actions may justly be called chemico-animal; that though in many disorders the chemical powers act with more force than in health, yet, as long as the least spark of life remains, an action merely chemical does not take place in the human body, and of course the scheme of curing disorders merely by hyperoxygenating and deoxygenating the system, is not practicable, is capable of leading physicians into frequent mistakes, and therefore upon the whole cannot but prove injurious to mankind. Thus omitting all farther animadversion on this theory, I shall only observe by the by, that the imperfections and deficiencies of this system are so obvious, as to have made some impression even upon the chief advocates of the pneumatic doctrine, as will appear from an extract of a letter written by the celebrated Dr. Beddoes, before a great partisan of the pneumatic doctrine,

to Dr. Rollo. “ You ask my present opinion on
 “ consumption. Allow me generally to say, I
 “ have now no chemical theory of any one disease. I
 “ never held any such opinion. In different ways
 “ (at lectures and in publications) I started con-
 “ jectures to be compared with facts; and now I
 “ think all those conjectures are shown to be erro-
 “ neous by facts. I used to think my hypothesis
 “ on scurvy very probable, and I was confirmed
 “ in this idea by Dr. Trotter. But I at present
 “ think we are both mistaken*.” Thus there is
 reason to expect, that, upon more mature reflexion
 on the animal economy, both in the healthy and
 morbid state, the pneumatic physicians will change
 their opinion.

The third opinion, according to which diabetes
 is a local disorder of the kidneys, already proved in
 part by the critical remarks I have made on the
 former hypotheses, is farther confirmed by the fol-
 lowing circumstances.

I, By the function of the kidneys in the healthy
 state. It has been the general opinion till lately,
 that the secreted fluids pre-existed in the blood, and
 passed through their organs as it were through a
 sieve. Some years ago, however, physiologists,
 considering the peculiar structure of the secreting
 vessels, the difference of the secreted fluids from
 the blood as to their chemical properties; that no
 liquor having resemblance with any of the secreted
 fluids can be prepared by chemical means from the
 blood; the peculiar functions which they serve to

* Rollo, 1. l. vol. ii, p. 8.

perform ; and the changes, which they undergo in different disorders ; conceived, that all these phenomena could not be explained, without having recourse to a peculiar power residing in each secretory organ, by which the blood flowing to it is changed into a fluid of a peculiar kind. This opinion is at present generally adopted. But though the medical men of the present day mostly agree, to grant to each secretory organ the faculty of converting the blood into a peculiar fluid, yet some of them still consider the kidneys as sieves, by which a considerable quantity both of saline and other matters noxious to the animal economy is discharged from the body ; being confirmed in this idea, by the circumstance, that the smell and colour of many substances taken, which cannot be converted into a nutritious liquor, are observed within a few hours afterwards in the urine. This denial, however, to the kidneys of the faculty granted to all other secreting organs is in my humble opinion quite inconsistent with the laws of secretion. Indeed the consideration of the beautiful structure of the vessels of the kidneys is alone sufficient to prove, that these organs are destined to secrete a peculiar kind of fluid, but by no means like a sieve to let all fluids noxious to the animal economy pass through them. The urine pre-exists in the blood as little as any other secreted fluid ; but is formed by the secreting vessels of the kidneys. No chemist is able to draw urine from the blood, but it is a fluid of a peculiar kind, as to its chemical properties, quite different from the blood. If the urine thus possess all the characters common to the secreted fluids, why is the faculty of converting the blood into a peculiar fluid,

fluid, granted to all other secretory organs, to be denied to the kidneys? The less, as an acid of a peculiar kind, not to be obtained either from the blood, or from any other animal fluid, may be extracted from the urine: an unequivocal sign, that this fluid does not merely pass off by the kidneys as through a sieve, but that these organs, being specifically stimulated by the blood, react so as to form the urine in consequence of this stimulus.

It may perhaps be argued, that the urine, being an excrementitious fluid, cannot be a product of secretion; that the quantity of urine increases or diminishes in proportion to the liquids taken; and that the smell of some substances, such as oil of turpentine, may easily be discovered in the urine. To these objections I answer, that it is a matter of indifference, whether the fluid to be formed by the secretory organ be excrementitious or not. It is quite sufficient, that it shows peculiar properties, not to be met with in the blood: for the quality of the secreted fluid depends both upon the structure of the secreting organ, and the specific stimulus it receives from the blood, in the compound ratio of which all secretions are performed.

It is indeed true, that the secretion of urine is increased by taking liquids in large quantity. Nothing, however, can be concluded from this; for they operate only as stimuli to excite the action of the kidneys; as it is well known, that not the liquid taken, but urine, is expelled from the body. In fine, the smell and colour of some substances observed in the urine show only, that they are incapable

pable of being changed into an animal fluid by the powers of nature. Now as the kidneys, when in a healthy state, in consequence of their peculiar structure separate from the blood matters that would prove noxious to the animal economy, it is not to be wondered, that these substances also are separated from the blood by the kidneys, and thus expelled the body with the urine.

Though thus the fluid secreted from the blood by the kidneys is excrementitious according to the laws of health, nevertheless the kidneys, in the same manner as all other secretory organs, may be altered in their action by morbid stimuli, so that, operating in a quite different manner, they may secrete, instead of the ordinary urine, a fluid as to it's properties partly or altogether different from it.

2, The nature of the disorder. In the diabetes insipidus the secreted fluid in many respects still partakes of the nature of urine, and the preternaturally increased quantity of the secreted liquid is the chief morbid appearance that is to be observed. Now it is well known, that every secretion is increased by the application of stimuli; and that the medicines, which stimulate the urinary system (diuretics), excite an extraordinary secretion of urine. Of course it is highly probable, that the increased secretion of urine in diabetes is occasioned by a morbid stimulus, which, exciting the secretory organs of urine, produces, according to their different reaction, an increase of either insipid or sweet urine.

3, The

3, The causes of diabetes often clearly prove, that a morbid stimulus disturbs the action of the kidneys. Sydenham has observed this disease from the healing up of an inveterate ulcer. Whytt and Corwick witnessed diabetes brought on by repelled gout *: Dr. Webster has seen diabetes produced by the retropulsion of the itch †: Dr. Rollo's second patient had been subject to the piles previous to the disorder ‡: Dr. Hope's patient got the disease from a suppression of perspiration: the patient of Dr. Falconer became diabetical from drinking large quantities of spruce beer §: and professor Richter, of Goettingen, has seen two instances, in which it was evident, that the disorder arose from a morbid stimulus operating on the urinary system. The first of these patients had previously laboured under a bilious fever, which was indeed removed, yet, though the fever was gone, the patient was not perfectly restored, and within a fortnight afterwards was attacked with diabetes. As the anxiety and a sense of fulness in the region of the stomach, a foul tongue, a small, quick pulse, and the increase of all the symptoms toward the evening, seemed to indicate, that vitiated bile was still lodged in the stomach, an emetic was given, by means of which a great quantity of bilious matter being thrown up, the diabetes directly disappeared, and the patient perfectly recovered. The other got the disorder from suppression of perspiration. Antimonials and

* *Opera*, p. 597: and *Med. Comment.* vol. ix.

† Sandifort, *Bibliotheca med. et Phys.* vol. vi.

‡ L. l. vol. i, p. 74.

§ L. l. vol. ii, p. 23 and 24.

the warm bath removed the malady for a time; but it returned twice. On some scorbutic symptoms appearing, wort was given him to drink, during the use of which the diabetes by degrees disappeared *. Now if we take a general view of all these cases, we shall see our opinion clearly demonstrated: for it is pretty evident, that a consolidated ulcer, repelled gout or itch, suppressed hemorrhoids, corrupted bile in the stomach, drinking of a large quantity of spruce beer, or suppressed perspiration, cannot produce diabetes by impeding the powers of sanguification, or by hyperoxygenating the system; but that they operate as so many morbid stimuli, by altering the action of the urinary organs.

Diabetes therefore is by no means a disease of the system in general, or of the stomach, but is a local disorder of the kidneys; and the saccharine matter, which is found in the urine of those, who labour under diabetes, is an effect of a specific reaction of these organs produced by the morbid stimulus.

4. The symptoms, with which diabetes is attended, likewise show, that the source of the disorder is to be looked for in the kidneys. For a pain or at least an uneasy sensation at the region of the kidneys is a constant symptom in this disease. This is not only proved by the observations of Richter and Frank, but in all the cases, recorded by Dr. Rollo, this symptom occurred. This uneasy sensation, however, is not always so strong as to deserve the name of pain; on the contrary, nature grows as it were accustomed to it in time; and

* L. l. p. 78 and 79.

this seems to be the reason, why it is sometimes overlooked in enumerating the symptoms of diabetes; though upon a more minute inquiry it will be found, that this symptom has always been present in the beginning of the disorder. The patient, who was lately in Guy's Hospital, did not make any mention of an uneasy sensation in the region of the kidneys among his complaints: however upon a more particular inquiry into his symptoms, he told me, that, at the time the disorder was coming on he had felt an uneasy sensation at the seat of the kidneys, which uneasy sensation always became worse previous to the voiding of urine; a phenomenon, which, as far as I know, has not been noticed, except by professor Richter, who records, that he constantly met with this symptom in all his patients. It is indeed true, that a keenness of appetite, an uneasiness in the region of the stomach, a distressing thirst, acidity of the *primæ viæ*, a dry parched skin, and a quick pulse, are besides for the most part observed in diabetes. But it has been observed above, that these symptoms are only to be imputed to the sympathy existing between the kidneys and the stomach; that the appetite may fail, or be diminished, without any decrease of the diabetes; and that these symptoms are therefore generally lessened or increased by the increase or diminution of the urine. The excessive thirst, keenness of appetite, and dryness of the skin, are not easy to be explained in such a way; but from this, that nature always attempts to repair her losses, and that the secretion of any organ being considerably increased, the blood is solicited to that organ, and the other secretions are in proportion diminished.

The

The symptoms of diabetes thus afford a fresh argument to prove, that this disease is a local disorder of the urinary system.

5, The medicines, by which diabetes is often cured, no less corroborate this opinion of the seat of the disorder. Dr. Richter has cured two diabetic patients, in whom the cause of the complaint did not appear, the one by ipecacuanha, and the other by small doses of emetic tartar united with valerian*. Corwick has removed it by Dover's powder†. Brisbane has found the tincture of spanish flies, and emulsions with camphor, very efficacious‡. Dr. Rollo has removed diabetes by emetics, kali sulphuratum, hepatised ammonia, laudanum, issues, and living upon animal food§. Dr. Darwin has experienced much benefit from large doses of opium in reducing the quantity of urine||. Mr. Scott has twice cured diabetes with mercury and nitrous acid, after many other remedies had been tried in vain¶. Dr. Beddoes mentions a case of a diabetic patient, three times cured by using the Bristol water**. The patient lately in Guy's Hospital was very much relieved by the use of the tincture and infusion of spanish flies; and my worthy friend Dr. Woodville, physician to the Small Pox and Inoculating hospital, has also lately experienced much benefit from the tinc-

* L. l. p. 81.

† *Med. Comment.* vol. x.

‡ *Select Cases.*

§ L. l. vol. i.

|| Rollo, l. l. vol. i, p. 192.

¶ Rollo, l. l. vol. i, p. 203.

** Rollo, l. l. vol. ii, p. 7.

ture of Spanish flies, given in large doses, in a diabetic patient.

If we take a general view of all these remedies, we shall find, that they are neither able to restore the powers of assimilation and sanguification when weak; nor can possibly operate by deoxygenating the system, as some of them contain a considerable quantity of oxygen: but that they all act, either by diminishing the irritability of the kidneys to the stimulus, or by communicating new motions to them; by both which means the morbid stimulus may be removed; that is, they all operate as antispasmodics or anodynes. The cure of diabetes by such remedies therefore affords a fresh argument to show, that diabetes is not a disease of the system in general, but a local disorder of the kidneys; and thus of course the effect of it, that is, the secretion of a peculiar urine, possessing a large quantity of saccharine matter, is to be imputed to the altered action of the secreting vessels of the kidneys.

6, As the nature, causes, symptoms, and cure of diabetes evidently show, that this disorder depends upon a morbid state of the kidneys, the seat of the disease is likewise put beyond all doubt by the dissections of such bodies, in which the kidneys are always found in a greater or less degree in a preternatural state, and sometimes very much enlarged and relaxed*. Let it not be objected, that

* Morgagni, de *Sedibus & Causis Morb.* vol. ii, epist. 41, N. 15, & 42, N. 13: Ruysch, *Opera Omnia*, vol. i, obs. 13: Bonnetus, *Sepulchretum anat.* T. ii, lib. 3, sect. xxxvi: Rollo, l. i. vol. i, p. 115, & vol. ii, p. 5: and more especially the excellent work of the celebrated physician and anatomist Baillie, p. 275.

the morbid appearances observed in the kidneys are the effects of the disorder, and not it's cause. For, beside that the nature, causes, symptoms, and cure of diabetes prove, that it is owing to a morbid state of the kidneys, there are always observed, upon accurate examination, some changes of the structure of the kidneys in any period of the disorder: not to mention, that it would seem a little paradoxical to maintain, that the structure of the kidneys has undergone these changes in consequence of the disease, while not the least change of structure is usually to be observed in the stomach, or lymphatic system, the sources of diabetes according to the former opinions. As thus the nature, causes, symptoms and treatment of diabetes clearly demonstrate, that this disease is a morbid state of the kidneys, and this is farther confirmed by the dissections of such bodies, it follows of course, that the saccharine matter found in the urine of such patients must derive it's origin from an altered action of these organs.

7, It is also by no means uncommon, for the secretory organs of urine, when specifically stimulated, to secrete urine of a peculiar kind; as, on the contrary, this frequently happens in many diseases. Thus, for instance, in the inflammatory fever, instead of the ordinary fluid, urine of a flame-colour is secreted; in bilious fevers the urine becomes like that commonly voided by a horse; in hysterical patients a pale almost colourless urine is secreted in a large quantity; in worm diseases the urine very often resembles a milky fluid; in jaundice the urine becomes dark yellow, or croceous; in

in hectic fever an urine is secerned of an orange colour; in chronic diseases in atrabilious constitutions a greenish urine is not unfrequently met with; and in acute fevers, especially when growing worse, the urine is often changed into a blue, livid, or black fluid. Thus we see how many changes the urine is capable of, when the secerning vessels of the kidneys become preternaturally stimulated. It is of course not any way strange, that in diabetes, a fluid as to it's colour, smell, taste, and consistence, different from ordinary urine, is secerned.

8, Lastly, that the saccharine matter is formed by the kidneys is put beyond all doubt by the experiments made by Dr. Dobson and Dr. Rollo. According to the analysis of the human milk by Young and Voltelen, twelve ounces of this liquid contain ziii of sugar; but the same quantity of urine in the diabetic patient of Dr. Dobson yielded zviiiiss . In the cases recorded by Dr. Rollo the proportion was as follows. In the first case a pound of urine contained zix of sugar*; in the second case, $\text{zviii} \text{ } \text{§i} \text{ } \text{†}$; in the third, $\text{zviii} \text{ } \text{‡}$; in the fourth, $\text{zviii} \text{ } \text{§}$; and in the fifth, more than $\text{zxiv} \text{ } \text{||}$. Now from what source is this considerable quantity of saccharine matter to be derived? By no means from the powers of sanguification, because these would change the chyle into blood, from which no saccharine matter can be extracted. And as little from the morbid

* Rollo, vol. i, p. 4.

† Vol. i, p. 85.

‡ Vol. ii, p. 34.

§ L. l. p. 48.

|| L. l. p. 74.

state of the stomach, producing from substances capable of forming it saccharine matter: for the quantity of sugar, which may be had from the urine of such patients, is much greater than possibly could be extracted from the substances taken by the stomach; supposing this organ possessed such faculty, because the urine discharged in diabetes is generally equal to all the food and drink, and very often far exceeds them.

It follows therefore that we must have recourse to a peculiar action of the kidneys in order to account for the formation of such a considerable quantity of saccharine matter.

Diabetes may thus be defined to be an alteration of the action of the kidneys, by which a considerably increased secretion of urine generally more or less sweet, takes place.

The disorder is attended with a dry parched skin, pain or uneasiness at the region of the kidneys, increased previous to the discharge of urine, and a distressing thirst, to which symptoms, especially in the diabetes mellitus, are commonly added a palpitation of the heart, keenness of appetite, an uneasy sensation at the region of the stomach, with a strong tendency to acidity in it, cough, and a small quick pulse.

There are two species of this disorder. In the one the urine is inodorous; of a pale colour, and not sweet to the taste. In the other the urine resembles as it were a watery solution of brown sugar, and

and is remarkably sweet both to the smell and taste. Whether no saccharine matter at all may be obtained from the urine voided in the diabetes insipidus is hitherto not ascertained; the analogy, however, which exists between the two species, and the various changes, which the urine undergoes even in the diabetes mellitus during the course of the disease with regard to it's degree of sweetness, seem to prove the contrary. This opinion becomes confirmed, on considering, that the same characteristic symptoms occur in both, and that Dr. Frank has cured both these species of diabetes with the same remedies *: though this physician observed the diabetes mellitus to yield much slower than the insipidus to the use of medicines, and it's cure is generally tedious, I therefore strongly suspect, that, upon accurate examination, saccharine matter can be likewise drawn from the urine in the diabetes insipidus; though not in such a considerable quantity, as from the urine of a patient, who labours under the diabetes mellitus.

As all other diseases so diabetes has likewise it's predisposing and occasional causes. The predisposition to diabetes seems to consist in a certain degree of weakness, either of the whole system, or of the kidneys alone. I am inclined to believe this, because diabetes is not unfrequently met with in the convalescent from fevers, especially when obliged to work hard; because this disorder may be brought on by excessive indulgence in spruce beer, or by taking large draughts of warm water; and lastly,

* *Ratio Instituti clinici ticinensis*, cap. viii, p. 201.

because authors of very high reputation record, that persons debilitated either by former diseases, or by any other cause, are found to be very liable to this disorder*. It is not requisite to diabetes, however, that the patient be weakened by some previous disorder; as without any debility of the system a local weakness of the kidneys can take place, which, in conjunction with a proper occasional cause, is sufficient for the production of diabetes.

The exciting causes of this disorder are all morbid stimuli, which by irritating the kidneys alter their action; as we have seen above, that by suppression of respiration or hemorrhoids, consolidation of an inveterate ulcer, retropulsion of gout, or itch, &c., in predisposed habits, diabetes is produced. Nay, the action of the morbid stimulus may be so forcible, that, without any previous weakness of the kidneys, diabetes may be brought on merely by the too violent irritation; while in debilitated persons even slight stimuli, which when operating upon those in sound health would have no effect at all, are capable of producing the disease.

The proximate cause of diabetes thus, in my humble opinion, consists in a certain degree of debility of the kidneys, combined with morbid increased irritability of these organs.

* Sydenham, *Opera Omnia*, p. 307, 308, & 618: Buchan's *Domestic Medicine*, chap. 32: Macbride, *Introductio Methodica in Theoriam, et Praxin Medicinæ*, p. 225: Burserius, *Inst. pract.* vol. iv, p. 491: & Frank, l. l. p. 202.

Though

Though the disorder is generally ominous, difficult to be remedied, and often terminates in death, particular attention ought to be paid to the following circumstances in it's prognosis.

1, The different species of diabetes. *Ceteris paribus*, the diabetes mellitus is more dangerous than the insipidus; it is always found difficult to be removed, and often proves fatal *. The reason, why the diabetes mellitus proves more dangerous than the insipidus, seems to be because in the latter the body is only weakened by the irritation of the morbid stimulus; whereas in the former, the system suffers not only by sympathy, but besides a considerable quantity of the blood is exhausted in the generation of this sweet urine, and of course the rest of the blood becomes incapable of affording proper nourishment to the system,

2, The remote causes of the disease. For as the morbid stimuli are more or less difficult to be removed, the hope of recovery is likewise smaller or greater. Thus, for instance, diabetes, when succeeding to malignant fevers before the crisis, is almost always fatal. When convalescents from fevers are attacked with this disorder, the situation of the patients, though not so dangerous as in the former case, is still very critical: for here patients scarcely possessing sufficient strength to perform the functions of the animal economy, are seized afresh with a dreadful debilitating disorder. On the contrary, if diabetes arise either from suppressed per-

* Frank, l. l. p. 205 and 206: and Rollo, l. l. vol. ii, p. 9.

spiration, or from fordes of the *primæ viæ*, the prognosis is more favourable; and the malady, especially in it's commencement, may be removed without great difficulty, and in a short space of time *.

3, The degree and duration of the disease. For a slight degree of diabetes is not only curable, but is often soon remedied †; because the danger varies according to the greater or less violence of the morbid stimulus, and the different re-action of the secretory organs, in the compound ratio of which are the quantity and the quality of the secreted fluid. This seems in a great measure to explain, why diabetes proves in some cases a very rapid consumption; as Dr. Dobson has known it to terminate fatally in less than five weeks, and the patient of Dr. Oosterdyk died on the tenth day of the disorder: while in other cases, on the contrary, it is a chronic complaint; though it is not to be denied, but that this is partly to be imputed to the keenness of appetite of the patients, which in some measure happily keeps pace with the necessities of the system. The duration of diabetes is not less to be considered. Thus Dr. Richter has cured the highest degree of diabetes, when only in it's commencement, in a few days ‡: whereas, if the diabetes have been of a very long standing, the cure is more difficultly obtained, the disorder then scarcely yields to the most powerful medicines,

* Richter, p. 78 and 79.

† Burserius, l. l. vol. iv, p. 491.

‡ L. l. obs. xxiv and xxv.

and sometimes it proves incurable ; both because the morbid disposition to secrete a sweet urine, when it has been impressed on the kidneys a long space of time, becomes as it were habitual to them, and is afterwards difficult to be removed ; and because the morbid stimulus, when not destroyed, continually operates on the secreting vessels of the kidneys, which of course become daily more and more perverted from their usual office, and at length wholly depraved, that is, a total alteration of their structure takes place. Hence the longer diabetes has continued, the more difficult it is in general to be removed, so that when inveterate it is very often found to defy the powers of art.

4. The age and constitution of the patient. For persons in a declining stage of life are seldom radically cured. In old people the disorder is of the chronic kind ; the patients are as it were worn out, and at last a hectic fever comes on, which terminates in death. The reason seems to be, that the vital principle cannot be sufficiently stimulated to resist the morbid stimulus ; and because the morbid disposition to secrete a sweet urine being once impressed on the kidneys is very difficult to be abolished ; since the solids are by no means so able to undergo different changes in people of an advanced age, as in young persons. It needs scarcely to be mentioned, that cachectic persons, or those who are debilitated by drinking or venery, when attacked by diabetes, are generally soon carried off* ; as it is

* Buchan, l. l. chap. xxxii.

evident, that their unhealthy and enfeebled bodies cannot resist the morbid stimulus with the requisite force, but must soon yield to it.

With respect to the treatment of this disease, if we consult authors about it, we shall meet with the greatest contradictions: for while some assert, that tonics and astringents are the most powerful remedies, so others on the contrary are of opinion, that they are at best useless, and often mischievous, but, that the utmost success is to be derived from antispasmodics and anodynes. On both sides are men of very high reputation, and both found their opinion on their experience. If, however, we consult nature, the matter will soon be settled, for as diabetes may arise from very different causes, the natural inference must be, that there is no specific for this disease, but that it's cure is to be founded on general principles; that is to say, the disease is to be removed by the removal of it's cause. In all cases of diabetes therefore the treatment ought to be suited to the nature of the morbid stimulus, which has given rise to the disease. Of course if diabetes be produced by suppressed evacuations, these are to be restored; if the disorder be occasioned by repelled cutaneous eruptions, these are to be brought back again to the surface; if by suppressed perspiration, antimonials, spiritus Mindereri, opium, ipecacuanha, and the warm bath, are efficacious.

Diabetes may arise from various other causes, but it's two chief sources are a morbid state of the *primæ viæ*, and a preternatural affection of the lymphatic

lymphatic system: for though it has been a mistaken notion of Dr. Rollo, that the seat of diabetes is in the stomach, yet the remote cause of the disease is frequently to be looked for in the *primæ viæ*. Dr. Richter cured diabetes originating from a bilious matter in the stomach by giving an emetic. And vomits are truly useful in diabetes in many respects; for in all cases, where the cause of diabetes is in the stomach, by taking away the cause, they remove the disorder itself. Besides, the action of the stomach is very generally disturbed in this disease, both by the sympathy between the kidneys and the *primæ viæ*, and by the sudden change of diet. Hence though the diabetes do not originate from a morbid state of the *primæ viæ*, yet fordes of the alimentary canal are mostly met with in this disease; which considerably aggravate the symptoms, so that the removal of them cannot but give some relief to the patient. In all cases, during the whole course of the disease, the *primæ viæ* are, therefore, to be kept clean by the occasional exhibition of emetics and purgatives. Of the latter calomel and rhubarb best answer the purpose. Lastly, emetics are often found very beneficial in this disease, on account of other motions communicated to the kidneys by their shaking the whole system, and by their diminishing the irritability in consequence of the relaxation succeeding to vomiting; though it must be observed, that in cases, where great debility and relaxation of the system take place, emetics are either wholly to be omitted, or at least we ought to be cautious in their exhibition.

That

That diabetes very often originates from the morbid state of the lymphatic system is placed beyond all doubt, by the very symptoms with which the disease is frequently attended; for the urine discharged in diabetes often exceeds the quantity of ingested food and drink in a considerable degree. It would be easy to prove this by many instances, but for brevity sake I shall only mention a few striking ones. Dr. Dickson records, that a diabetic patient passed off six or seven pints of urine in twenty-four hours, though his drink during that time did not exceed four pints, and his appetite was quite gone; nevertheless he lived under the disorder more than six weeks*. In the first patient of Dr. Rollo the quantity of urine exceeded the quantity of drink taken by nearly one half†. Dr. Oosterdyk mentions a case of a diabetic patient, who voided every twenty-four hours at least seven pints of urine, and sometimes as far as ten pints, though his drink was at the most only one pint and a half during that time‡. Dr. Richter saw a patient, who passed every day thirty pounds of urine, and notwithstanding had laboured under this disorder four weeks, before he came under his care, without having contracted any considerable degree of weakness§. The urine of the patient, who was lately in Guy's hospital, daily exceeded by about one half the drink taken during the course of several weeks. Now as it is evident, that the

* *Med. Obs. and Inquir.* vol. iii, p. 140.

† *L. l.* vol. i, p. 159.

‡ *L. l.* vol. xii.

§ *L. l.* p. 140, in a note.

bodies of such persons, though wholly changed into fluid, would still prove incapable of supplying so great a loss during some days, and much less during so long a time, it must be concluded from these instances, that the water is absorbed from the atmosphere by the lymphatics.

Nay, evident symptoms of the morbid state of the absorbent system not unfrequently appear in diabetes in these cases. Dr. Dickson observes, that the urine of his patient was constantly found considerably increased on moist and rainy days, though the drink fell short of the usual quantity: and Dr. Dobson records, that his patient had sometimes for five or six days together the symptoms of an ascites, the belly swelled, and there was an evident fluctuation in it*. In these cases, if the physician attempt to check the quantity of urine by the exhibition of astringents, especially of the fossile kingdom, the consequence is, that, though the discharge of urine is considerably diminished, still the patients do not experience relief; for the absorbent vessels continuing to attract water from the atmosphere, at the same time that the urinary organs are hindered, by the use of astringents, from expelling the quantity taken in, the natural consequence is, that the absorbed fluid is poured out into the cavity of the abdomen, and the patient becomes dropical. Of this Dr. Babington experienced a remarkable instance in Guy's hospital. He gave the patient already spoken of the alum whey, when his urine considerably diminished, but his abdomen swelled, and an evident fluctuation

* *Med. Obs. and Inquir.* vol. v, p. 300.

was observed in it. This situation distressed the patient so much, that the physician was obliged to leave off the astringents, and to have recourse to squills, by which the secretion of urine being promoted, this dropical disposition gradually went off. In these cases the remedies, which diminish the irritability of the system in general, and of the absorbents in particular, such as opium, cicuta, belladonna, hyosciamus, kali sulphuratum, hepatised ammonia, and especially the preparations of cantharides, are the best calculated to put a stop to this inordinate action of the absorbent vessels.

But though the fact is, that no specific for diabetes exists, that the treatment of the disease is to be suited to the nature of it's existing cause, and of course that the physician ought always minutely to inquire after this; yet we are frequently called upon in cases, in which, after the most careful investigation of the disease, the cause is not to be discovered.

For this there appear to be two reasons. In the first place, diabetes usually comes on by degrees, and from it's not being attended with much pain or uneasiness the patient is still able to go through his daily occupations, and in consequence does not seek for any medical assistance, till he has laboured under diabetes during a long space of time. In the second, it seems, that frequently the cause of the disorder may be removed, without it's effect, the diabetes, ceasing at the same time; on account of the habitual disposition to secrete a sweet urine impressed on the kidneys. For in the same manner as the epilepsy, St. Vitus's dance, and other con-

convulsive disorders, when brought on by worms, by fordes of the *primæ viæ*, or by a morbid state of the abdominal viscera, frequently remain after their causes have been removed, especially if the disease have been of a long standing, merely on account of the nervous system having acquired a habit of running into irregular motions at certain periods; so if diabetes have been of long duration, though the morbid stimulus, which brought on the disease, be removed, the diabetes still goes on, because the kidneys are brought into the habit of secreting sweet urine by the long continuance of the morbid stimulus. Indeed there exists a great analogy between diabetes and the convulsive disorders in many respects.

Supposing then, that it is impossible to find out the cause of the diabetes, or that, this being removed, the diabetes still remains from habit alone; the first thing we ought to do in diabetes mellitus, in all cases, is to put the patient upon a diet chiefly consisting of animal food, as it appears from the cases mentioned by Dr. Gerard and Dr. Frank*, that an absolute exclusion of vegetables is not necessary, and a certain allowance of these, being acceptable to the patients, makes them more willing to submit to the regimen prescribed, and to pay the strictest attention on their part. But to live chiefly upon animal food is requisite for the removal of the disorder, since the animal diet, though it does not cure diabetes by itself, affords a temporary relief, renders the disorder milder by suspending the for-

* Rollo, l. l. vol. ii, p. 125: and Frank, l. l. p. 208.

mation of the saccharine matter, and puts it in the physician's power to use efficacious remedies to rouse the vital principle to remove the morbid disposition impressed on the kidneys; the removal of which would prove much more difficult, if the disorder have not been previously mitigated by the living upon animal food. Not to mention, that animal food, being more nutritious than vegetable, a diet of the former kind is far preferable in a disorder, wherein a considerable part of the blood is daily spent in creating a preternatural fluid.

With respect to the remedies by which the morbid disposition to secrete a sweet urine, or the morbid state of the kidneys, is to be removed, this depends entirely upon the constitution of the patient, and the symptoms that attend the disease. We have proved above, that the proximate cause of diabetes consists in a certain degree of debility of the kidneys joined with a preternaturally increased irritability of these organs. In all cases, therefore, in which the weakness of these organs seems to have contributed but little to the disease, and the diabetes seems to be chiefly owing to an increased irritability of the urinary organs; when the patients are in other respects in a pretty healthy state, and do not show any tokens of debility of the system; those medicines, which operate by diminishing the irritability of the habit in general, and of the kidneys in particular, such as *cicuta*, *belladonna*, *mercury*, *extractum hyosciami*, but more especially the preparations of *cantharides*, *kali sulphuratum*, and *hepatized ammonia*, prove highly beneficial. The operation of these remedies is to be promoted by the
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occasional use of opium, both in order to prevent the symptoms sometimes produced by them, and to accelerate the cure. Tepid baths are likewise of considerable utility under such circumstances; for by rendering the skin soft they promote insensible perspiration, and by relaxing the body they prove a powerful sedative.

If on the contrary the debility of the kidneys should have a considerable share in producing the disease, and the body appear to be enfeebled, the tonic and antispasmodic remedies are to be employed, among which the bark, snake-root, alum, valerian, and the preparations of steel, zinc, and copper, are the chief. As a weak organ is liable to be disturbed in it's functions even by a slight morbid stimulus, and the increased irritability of any part is not unfrequently owing to it's debility, it is easy to be understood, how tonics, in these cases, by strengthening the system in general, and the kidneys in particular, prove powerful antispasmodics, and are capable of removing the morbid disposition; especially when taken in conjunction with opium. Opium, however, ought always to be combined with the use of tonics, in order to diminish the irritability, and to keep off all irritation; because the tonics, when administered without it, sometimes operate as irritating remedies, and the irritability of the system is increased by their use; the more, as upon inquiring into the cases, in which tonics have remedied the disorder, we shall find, that they have proved the most beneficial, when opium has been given along with them. It needs scarcely to be mentioned, that, when debility

of the system takes place, cold bathing proves useful, and considerably promotes the cure of diabetes. In all cases of diabetes, during the whole course of the disease attention ought to be paid to keep the *primæ viæ* clean by exhibiting rhubarb, calomel, and emetics, when necessary.

As it is well known, that in many cases, both physical and surgical, issues or setons are extremely useful to take off the morbid irritability of the affected organs, and to diminish their increased action, by soliciting the humours towards another place, it is *a priori* presumable, that issues over each kidney must considerably assist the other remedies, in curing diabetes. This is confirmed by two cases recorded by Dr. Rollo, in which issues were applied with great benefit to the patients*. These remedies are particularly suitable, when the diabetes arises from a consolidated ulcer, metastasis of a morbid matter, or repelled cutaneous eruptions, in which cases issues should never be omitted. If, on the contrary, diabetes, not arising from the above causes, take place in weak feeble persons, or have weakened the system very much by its duration, we ought, in my opinion, to be cautious in making issues, because, by farther weakening the system by their discharge, they would be in danger of doing mischief to the patient, instead of affording relief.

Physicians dispute, whether bleeding should be employed in diabetes. As far as may be concluded from the observations I have been able to collect,

* Rollo, l. l. vol. i, p. 15, and vol. ii, p. 55.

it seems to me, that venesection proves useful only under two circumstances: either when the occasional cause of diabetes is of such a nature as to be removed or abated by bleeding; thus, for instance, Dr. Burserius has opened a vein at different times with the utmost success in a diabetes arising from an inflammation of the bladder*: or when the patient, on account of his age or temperament, is inclined to an inflammatory state of the blood; especially if the diabetes be attended with a constant pain in the region of the kidneys, or with a local pain in the thorax combined with a difficulty of breathing; in which cases venesection operates as a powerful antispasmodic, and the patients find themselves a great deal relieved after the operation. If none of these circumstances exist, and the system seem rather weakened, venesection cannot but hurt the patient. Indeed it would be against sound reasoning, farther to weaken patients, who are scarcely capable of supporting the complaint they labour under, by taking away a quantity of blood.

When the diabetes is removed, it will be prudent to persist for some time in the medicines prescribed, and the animal diet; for if the precaution be neglected, the disorder is often reproduced. Besides, as diabetes is a disease, to produce which a certain degree of debility often greatly contributes; and as it's nature is such, that it can scarcely avoid bringing on some degree of weakness by it's continuance; in all inveterate cases of diabetes, after the removal of the disorder, I would advise the having recourse

* L. I. vol. iv, p. 491.

to tonics, in order, by strengthening the system, to prevent the convalescent from falling into many disorders, and even relapsing into diabetes itself, to which they are afterwards so liable from a slight deviation of their diet. Perhaps the reason, why the patients, who fell under the care of Dr. Rollo, remained afterwards weak and lean, and were obliged to be extremely careful in their diet and manner of living, in order to prevent the diabetes from being reproduced, ought partly to be attributed to this, that tonics were not used; at least the patients cured by Dr. Frank, after the removal of the disorder, enjoyed the same degree of strength as previous to it.

Lastly it is to be observed, that, though the fatality of this disorder is no doubt in great measure to be ascribed to it's nature being not well understood, and to the administration of the same remedies in all cases, frequently without paying the least regard either to the remote causes of the disorder or to the patient's constitution; yet it is by no means to be expected, that diabetes will be always radically cured by proper treatment; especially if the disease be of a long standing, and in people of an advanced period of life. For in the same manner as the idiopathic or habitual epilepsy, under such circumstances, is not unfrequently found to be incurable, on account of a considerable alteration of the structure of the brain, brought on by the long duration of the disease; so likewise diabetes, on account of the organism of the kidneys being considerably altered by the continuance of the disorder, often does not yield to the most powerful remedies.

Indeed,

Indeed, though alterations of the organic structure may be carried to a certain degree, without impeding the recovery of the patients by the administration of proper medicines, nevertheless as soon as a considerable change of the structure in any organ takes place, the cure of the disorder is to be despaired of as being beyond the power of physic. Now in such cases, where the most powerful remedies have been tried in vain, nothing can be done, but to palliate the disorder, and to support the system, by living chiefly upon animal food, and by the exhibition of the bark, opium, and the preparations of cantharides.

With respect to the manner, in which death is brought on in this complaint: in the insipid species, if the disorder be allowed to go on, by it's progress all the functions become impaired, and the solids, continually affected by the morbid stimulus, become at length wholly vitiated; whence a languor of all the functions, torpor of the vital principle, universal wasting, total loss of appetite, and a hectic fever, come on; by which the whole body is as it were worn out by slow degrees. In the diabetes mellitus, as the body is not only deadened by the morbid stimulus, but besides is extremely reduced by the subtraction of a considerable part of the blood for the formation of sweet urine, the hectic fever, attended with it's usual symptoms, follows generally more close upon the malady itself, so that this species of diabetes not unfrequently terminates fatally in less than five weeks. However, if either the appetite in some measure happily keep pace with the necessities of the system, or the alteration

in the structure of the secerning vessels of the kidneys take place in a less considerable degree, the patient often holds out surprizingly.

Yet those, who labour under diabetes, are not always carried off in the above way; for either a peripneumony or a fore-throat sometimes attacks the patients, towards the end of the disease; in which cases they are destroyed by a spurious inflammation. To account for this manner of dying of diabetic patients is very difficult, perhaps it is owing to a kind of sympathy between these organs and the kidneys, or to a translation of the disease to the above organs.

GENUS II.

Cancerous Ulcer.

THE cancerous ulcer is a sore with hard, ragged, unequal, and very painful edges, a very unequal surface with considerable risings in some parts, and deep excavations in others, attended with burning and shooting pains, a discharge of a thin dark coloured fetid ichor, and frequent hemorrhages, especially in the more advanced stages of the disease. The veins in the neighbourhood of the ulcer are in general considerably enlarged.

This dreadful complaint mostly succeeds to hard swellings of the glands, called scirrhusities, which
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may be distinguished from scrofulous tumours by their greater hardness and gibbous surface*.

Some writers on the subject, considering the little success that in general attends the extirpation of cancerous tumours, have fallen into the notion, that cancer is not a local affection, but originally proceeds from a particular morbid diathesis of the system; and consequently, that it's removal can never have any other effect, than to make the disease again break out in the same or in some other part of the body; the disorder generally returning, in by far the greater proportion of all that are cut, with more violence, and making a quicker progress, than it commonly does in others, on whom no operation has been performed. Nay, some have gone so far as to deny, that scirrhus is cancer in it's occult state; asserting, that scirrhus is a local affection, never passing into cancer, except in persons, in whom a cancerous diathesis exists. Hence they conclude, that the extirpation of scirrhus tumours is either unnecessary, or injurious: for, when the cancerous diathesis does not exist, the scirrhus will never occasion the least trouble to the patient; but if such a disposition of the system be present, the operation will serve only to quicken the death of the patient.

That in cases, in which cancerous ulcers, or scirrhus glands, appear in several parts of the body, the operation is not to be performed, and only hurries on the fate of the patient, is beyond all

* Soemmering, l. l. p. 105 & 106.

doubt; that likewise, when parts, which cannot be extirpated along with the cancer, are probably affected, the cancer is better left alone, no one will question; but these are only particular circumstances, brought on by the long duration of the disease, and from which consequently no general rule can be drawn. Indeed as long as these gentlemen are incapable of determining *a priori* whether a scirrhus will terminate in a cancerous ulcer, or not, so long every rational practitioner will judge it his duty, to have recourse to the extirpation of the affected part, as the only remedy to be trusted for saving the life of the patient, in all cases, where the circumstances, which forbid the operation, are not present; since scirrhus tumours, in an apparently healthy constitution, often degenerate into cancerous ulcers from an occasional cause, and a general cancerous taint, if ever, at least but rarely, occurs. The extirpation of all the affected parts is the only way of radically curing the disease with which we are acquainted; but the operation is to be performed in an early period of the disorder; as experience has shown, that there is but very little chance of success in the more advanced stages of cancer, because a cancerous diathesis is then commonly produced in consequence of the virus being taken up into the system by the absorbents. Therefore in all such scirrhusities, as from their nature are known generally to terminate in cancer, this is to be prevented by having early recourse to extirpation; whereas in open cancers, unless the ulcerated surface be very inconsiderable, the operation should not in general be performed, from the little
success

success attending the removal of the cancer under such circumstances.

The cicuta belladonna, and arsenic, have been warmly recommended for curing this complaint: but it is at present generally agreed, that the cure of the cancer is beyond the power of medicines; therefore, when the operation is not advisable, we can only palliate the different symptoms, so as to render the disease as tolerable to the patient as possible. This palliative treatment consists in avoiding whatever can irritate the body, prescribing the cicuta externally and internally, giving opiates and tonics, keeping the body open by gentle purgatives, using a mild nourishing diet, and externally applying a solution of alum, hydrargyrus muriatus, arsenic, or lunar caustic, Goulard's vegeto-mineral water, or a carrot poultice, by which means life is often supported for a long time.

As however none of these produce any permanent advantage in cases of real cancer, the complaint becomes by degrees exasperated, the patients grow emaciated and weakened, and a hectic fever comes on, by which they are destroyed. The consumption of the body derives it's origin partly from the stimulus of the cancerous ulcer continually operating upon the whole system, and partly from the cancerous diathesis, which the patients always sooner or later contract in this disease; for it is proved beyond all doubt, that the cancerous ichor is taken up into the system by the lymphatics. The celebrated Soemmering has very often observed the absorbent vessels of extirpated mammæ, affected with

with a cancerous ulcer, turgid with a thin, blackish, livid matter, and almost resembling varicous veins*.

Let it not be argued, that it is highly improbable, that an ichor so acrid as to excoriate and even to destroy the neighbouring parts, could be taken up by the lymphatic system without destroying their organical composition; for this difficulty directly vanishes, when we consider, that the destruction of the parts near the ulcer is subsequent to the excretion; that it may be greatly prevented by the repeated application of clean linen; and that therefore no conclusion can thence be drawn, that this ichor, when secreted, has the same degree of acrimony: the less, as no humour, however acrid it may be, proves irritating to the surface of the ulcer from which it is secreted. Besides, it ought to be considered, that the cancerous matter, though very acrid, is nevertheless an animalised fluid, or a product of the animal economy; now there always exists a much greater affinity between the absorbent vessels, and the humours, which possess the character of animalisation, though very acrid, than between those vessels, and other fluids destitute of this character; that in fine the cancerous matter is by no means taken up by the lymphatics, before the requisite affinity is produced between them, and the cancerous ichor; for from this source is to be explained, why the cancerous *diathesis* often appears so late; as the celebrated anatomist Dr. Cruikshank records, that he has observed the lym-

* L. l. § xlv, p. 107.

phatic glands in the loins turgid with this matter two years after an extirpation of a cancerous testicle, which seemed to be performed with success*. It appears therefore, that the above objection is of no weight, and that a great difference exists between acrid humours produced by the animal economy, and fluids possessing a chemical acrimony, with respect to the human body.

CONCLUSION.

THUS I have attempted not only to explain how the lives of mankind are destroyed by the different morbid stimuli; but also to show how their manner of destroying is consistent with the nature of every disease, and may often be determined beforehand from it, and what are the best means of preventing the morbid stimuli from proving fatal. It is true, indeed, that different effects arise from the same disease in different patients; but, on the one hand, these varieties, with regard to the manner of dying, and the means of preserving life by medical treatment, are mostly of inferior moment; and on the other, as the constitution of the body is differently modified in every person, the same malady does not produce entirely the same symptoms in any two patients; so that it is impossible to take particular notice of all these varieties.

* L. l. p. 113.

Thus having gone through the vast extent of noxious stimuli, and having laid down the manner in which each of them brings on death, together with the best means of successfully resisting their operation on the system; I shall now inquire, whether any general rules, as to the history of corporal death, can be drawn from what I have proved in the course of this treatise. We have seen above, that all the morbid powers, though very different, agree however in this, that they always affect our body as a stimulus; we have farther proved, that specific changes are produced in the human body, when stimulated in a determinate way, and that on this the whole difference of diseases depends.

As thus the morbid causes operate on our body with their peculiar stimuli; as the vital powers react differently, according to the different stimulus applied; as the nature of every disease is modified both by the noxious stimulus, and the reaction of the system; as, in fine, the different manner of dying, and the medical treatment requisite to preserve life, depend upon the different nature of the disease; it was requisite particularly to inquire into each of them in this treatise. Nature, however, which always follows constant laws, pursues a certain and determinate order, even in the different manners of destroying life. Hence all the morbid stimuli, however widely their circuit extends, however differently they operate, and however secretly they often steal on to destroy the organism of the body, put an end to life only in two general ways, either by extinguishing the vital principle, or by impeding or destroying the vital functions.

functions. Nay all the differences of death, on account of the analogy which exists between them, may be reduced to a few classes; so that I have ranked the morbid stimuli operating by extinguishing the vital principle in seven, and those which prove mortal either by impeding or destroying the function of one or two vital organs in five. The differences of dying belonging to every class may likewise be easily accounted for; because they do not exceed a certain and determinate number, as will appear on taking a general view of each of them.

In the first class, where death is the consequence of the mechanism of the body, man dies by the too great rigidity of the solids, and by their insensibility to stimuli. Such a state of the system, with the manner of dying dependant on it, is brought on the solids merely by life itself, without the least morbid cause, and is therefore distinguished from all the other classes, which destroy life by the operation of a morbid stimulus.

In the second class, in which death follows the too violent passions of the mind, the patients are destroyed either by an apoplexy, syncope, or suffocation. All these differences of dying therefore agree in this, that an accumulation of the blood takes place in some vital organ, which, overwhelmed by the too great quantity of blood, ceases to act. Though thus various organs are affected, according to the various passions, and the different constitutions of the persons attacked, nevertheless the patients are always carried off in this class by the impeded
function

function of some vital organ, arising from the congestion of the blood.

In the third class, where death is occasioned either by the excess, or want of *caloric*; if the patients be carried off by too great cold, the blood is always driven to the internal organs, and life is extinguished in the same manner as in the foregoing class. The same seems to happen, where the patients die from superabundant heat. It is indeed true, that hitherto nothing certain is proved as to the immediate cause of death in this case; yet if we consider the phenomena accompanying too great heat, it will appear, that, if not always, at least in most cases, life is destroyed either by apoplexy or suffocation.

In the fourth class, where death is produced by too great electricity, the life of all the organs is abolished, as it were, at a single shock, by the violence of the stimulus, so that the patients are immediately found insensible even to the most powerful stimuli. Thus they die by a sudden extinction of the vital principle.

In the fifth class, where death happens from some gas noxious to the animal economy, though the symptoms greatly differ, according to the various species of gas, the patients always die from suffocation.

In the sixth class, where death is produced by poisons, though at the first view nature does not appear to pursue a certain order as to the manner
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of dying, and though, besides, the true manner in which many poisons kill has hitherto not been properly investigated, nevertheless, upon a more accurate consideration, it seems, that the different ways of dying by poisons are also not numerous; but that nature, even in this class, follows constant laws, and, indeed, by all that I have above said of the poisons, the patients in this class seem to die only in four ways; for all poisons operate either by abolishing the vital principle by the violence of their stimulus; by destroying the action of either the brain, the heart, or the lungs; by producing gangrene of the *primæ viæ*; or, lastly, by secretly and insensibly destroying life. In the last case the organs becoming by degrees altered in their structure, and insensible to their usual stimuli, a tabes ensues, accompanied with a hectic fever, which terminates in death.

In the seventh class, where death is brought on by universal diseases, disorders are enumerated, which are quite opposite to each other; and hence it must follow, that many differences of dying also appear in this class. Yet the patients are only carried off in six different manners; for they die by the extinction of the vital principle by the too great violence of the morbid stimulus; by the impeded function of either the brain, the heart, or the lungs; by a local inflammation; by the gangrene of some vital organ; by an alteration of the organical structure in the alimentary canal, by which a colliquative flux of the belly is produced, which is to be stopped by no medicines; or by the depraved action of the organs serving to the secretion of sweat,

sweat, in which case the whole body is, as it were, consumed by perspiration.

In *the eighth class*, where death succeeds to inflammation, nature is not less observant of constant laws; and the inflammation of any *viscus* whatever leads to death only in four ways; by violent convulsions; by the function of either the brain, the heart, or the lungs being destroyed; by the violence of the inflammation, by which the vital principle is often quickly abolished, in consequence of the suppression of a vital function; or by the gangrene of some organ succeeding to it's inflammation.

In *the ninth class*, where death arises from different fluxes, all the differences of dying may be reduced to the five following: spasm, by which nature in vain endeavours to restore the disturbed equilibrium; the loss of too great a quantity of blood, by which the patients fall into a fatal syncope; the impeded function of some vital organ; sphacelus of the alimentary canal; and a peculiar degeneracy of the intestines, by which the patients are continually impelled to go to stool with extreme prostration of strength. If the last be attended with tenesmus, it is called a chronic dysentery; if not, it is named a colliquative diarrhœa.

In *the tenth class*, where death is occasioned by cachexies, though I have brought into it many diseases, nevertheless the differences of dying do not exceed ten: for death is produced by the consumption of some organ requisite to life, or from the destruction of the tone of the whole body by
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the violence of the stimulus, which is the manner in which phthisis destroys; by the violence of the noxious stimulus, which weakens the solids daily more and more without the consumption of any vital organ, as is the case in the lues venerea, scrofula, rachitis, &c.; by suffocation, by which those who labour under the dropfy of the thorax, are generally carried off; by apoplexy, in which a general dropfy not unfrequently terminates; by syncope, which manner of dying is particularly common to the scorbutic, on account of the torpor of their vital principle; by hemorrhage, by which the flame of life, already deadened by the disease, is totally extinguished; by a colliquative flux, which puts an end to life, by depriving the body of it's remaining energy; by the sphacelus of some organ; by the violence of the morbid stimulus, by which life is quickly abolished, a manner of dying, though unfrequent in the diseases of this class, sometimes happening in the sphacelus; and lastly, in mortification the absorbed ichorous matter, when not subdued by the vital powers, sometimes produces a malignant fever, which carries off the patient in different ways, according to the various circumstances.

In *the eleventh class*, in which death is occasioned by disorders of the nervous system, the different ways of dying are not so numerous; for in the same manner as all the nervous diseases may be reduced either to spasm, or atony, so likewise the chief ways of dying in this class are only two, and life is generally abolished either by violent spasms, or by an apoplectic fit.

In the twelfth class, in which death succeeds to the diseases of the secretory organs, three different ways of dying occur; namely, either the noxious stimulus, stealing on to destroy life, by slow degrees oppresses it, as is the case in polyfarcia; the solids become enervated, and altered in their structure, either by the continually stimulating noxious power alone, or both by this, and the exhaustion of the blood for a secretion of a peculiar kind, in each of which cases they are destroyed by a hectic fever accompanied with its usual symptoms; or the vital principle is abolished by the impeded or destroyed function of the brain, heart, or lungs.

Thus far I proposed to extend this treatise on the different ways, in which life is destroyed in mortal diseases, and the best means of preventing them by medical treatment from proving fatal. It is true indeed, that there are many matters in it, of which I have only spoken in a cursory way, though they deserve a more ample consideration; but the great number of things I had to notice, and the compass of this treatise, did not permit me to inquire more fully into subjects, which would have taken up some volumes, if treated of as they ought. Let it therefore suffice to have proved, that, though

“ Mille modis lethi miseros fors una fatiget,”

nevertheless the differences of dying are not innumerable, but, on the contrary, nature constantly follows certain and invariable laws even in the different

ferent manners of destroying life, so that all the differences of dying may not only be reduced to a few classes, but besides it may be determined in how many ways life can be extinguished in every class; and to have pointed out what are the best means of preventing death by medical treatment.

I now flatter myself with the idea, that however imperfect this performance may be, yet it may excite others to cultivate this important subject, and thus I may have contributed in some measure to the improvement of the healing art, and to the benefit of mankind.

THE END.

The first part of the book is a history of the
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